THE JOURNAL

OF THE

ROYAL UNITED SERVICE INSTITUTION.

VOL. XXXIX. JUNE, 1895. No. 208.

[*Authors alone are responsible for the contents of their respective Papers.*]

CAVALRY MANŒUVRES.

By Colonel J. D. P. FRENCH, late 19th Hussars.

Friday, March 29th, 1895.

Lieut.-General J. KEITH FRASER, C.M.G., in the Chair.

THE following observations are made on the invitation of the Council of this Institution, at the suggestion of the Inspector-General of Cavalry. I wish to repudiate any intention of a controversial nature, only desiring that my efforts may find sufficient favour to initiate a discussion and full expression of views, from which latter, I feel sure, we shall glean such instruction and matter for thought as will prove of value to us and the Cavalry Service generally.

As a useful guide in enabling us to form an opinion of what cavalry officers owe to manœuvres, I propose first briefly to consider the characteristics of some of the most important cavalry concentrations which have taken place in Europe during the last seventy years.

The first great cavalry manœuvres after the Napoleonic Wars were held near Berlin, in September, 1821.

A detailed account of the work done on the last day is to be found in von Kaehler's "Prussian Cavalry, 1806 to 1876." The manœuvres of this day are a fair specimen of what had taken place throughout.

Lengthy detailed instructions were issued: nothing was left to chance, and thus no scope was allowed for the initiation of individual leaders.

Sound fundamental principles were recognised, but the methods of execution by which these principles were put in practice were quite contrary to what the history of the past wars had taught.

Seeing that but six years had elapsed since the last shot had been fired in France and the Prussian Cavalry had charged in battle, von Kaehler considers these manœuvres a striking proof of the rapidity with which warlike tradition and the art of leading troops on the field of battle perish.

Notwithstanding their shortcomings, these manœuvres were not without result. In 1823 "Instructions on the Handling of Cavalry in Large Masses" was published.

of 1843, 1853, and 1857 in this respect had been forgotten by the generality of Prussian cavalry officers. In order to report on the true principles for the handling of large cavalry masses, a committee was assembled, under Count Stolberg, in March, 1872, and, as before, the regulations which resulted were practically tested at cavalry manœuvres in the summer of 1873. Three divisions of cavalry, each with three batteries, were concentrated. Each divisional commander was allowed perfect liberty both as to the formation of his brigade and method of instruction. We find a division of three brigades, each of two regiments, as well as one of two brigades of three regiments. Von Schmidt commanded one division and organised his division in three brigades. This seems to have met with the highest approval. Von Schmidt's method of training and handling cavalry is so well known to us all that I will not waste time in enumerating what he did. Suffice it to say that, as a result of these manœuvres, von Schmidt was appointed president of a committee in January, 1874. He was charged with the task of revising Chapter V. of the 1873 Drill Book, and, as before, the revised edition was tested at cavalry manœuvres; on this occasion the authorities were not satisfied with the experiences of one manœuvre, but the regulations were practised both in the manœuvres of 1874 and 1875.

Since then large cavalry manœuvres have been of annual occurrence, and have gradually led to the adoption of the rules now in vogue for the handling of cavalry. In fact, after each year's manœuvres, a step towards greater simplicity and efficiency takes place. But the same method of procedure is still followed as of old, namely, before any regulations are considered final they are issued in a "provisional" form. This was done in 1893, and the new regulations are only now about to appear.

It will thus be seen that in Prussia before any new instructions in handling cavalry are published they are always practically tested at manœuvres—indeed, on some occasions the new ideas are the direct outcome of the manœuvres. Moreover, whenever cavalry manœuvres take place an impetus is given to *practical* cavalry training, and progress in efficiency for war is made; while on the other hand, during a period of twenty-two years (1821 to 1843), in which no manœuvres were held, the training of cavalry degenerated to ceremonial parades.

As a further illustration of the foregoing remarks, I would call attention to a paper in the Journal of this Institution by Captain Maude, R.E., on "The Rise, Decay, and Revival of the Prussian Cavalry."

After considering these facts, will anyone doubt that the present acknowledged efficiency of the German Cavalry in mass tactics, and the large number of capable leaders to be found in every division and brigade, are not in a great measure due to the knowledge and practice gained in frequent manœuvres?

I have referred particularly to Prussia, but it is well known to all of us that annual cavalry manœuvres have now become an important feature in the military training of all the great European Powers.

So far, I have been obliged to draw upon the experience of the foreigner, for up to a few years ago we seemed almost entirely to have

followed in his footsteps, and accepted his views without practically testing them.

Some time ago, however, General Lord Roberts, when Commander-in-Chief in India, took the lead in giving practical effect to the long-recognised and oft-expressed need for annual independent cavalry manœuvres. A cavalry camp was formed in the Punjab in the winter of 1887, under the command of Major-General Luck, C.B., Inspector-General of Cavalry in India, since which date cavalry manœuvres have become an annual institution in that country.

Lieut.-General Sir Evelyn Wood, when in command of the Aldershot Division, initiated cavalry manœuvres in this country. In 1889, the first year of his command, a brigade of three regiments, under Colonel Wood, C.B., was detached for ten days to camp some twelve miles south of Aldershot. In the following year (1890) a regularly organised division of cavalry was assembled for a period of three weeks on the Berkshire Downs, under the immediate supervision of Sir E. Wood and his staff. In 1891 and 1892 a similar concentration was effected at Aldershot, under the supervision of the Inspector-General of Cavalry. In 1893 a cavalry division, commanded by the Inspector-General, formed part of the force assembled on Berkshire Downs for manœuvres, under Sir E. Wood; and the most recent assembly of cavalry, under the command and supervision of the Inspector-General, in the same country in 1894 is still fresh in the memories of most of us here.

In all the cavalry camps, both here and in India, the programme has generally consisted in a certain number of independent brigade drills under brigadiers, followed by similar exercises of the combined division; and finally the force is divided into two opposing brigades or divisions, according to its strength (brigades in this country, divisions in India), which manœuvre against one another, starting a considerable distance apart, under general and special ideas set by the Director of Manœuvres.

During manœuvres, opportunity is taken to test new equipment, and proposed methods of carrying kits, while experiments in forage and management of horses in the field are tried.

The manœuvre reports of the Inspector-Generals at home and in India are full of valuable comments, bringing to light errors and shortcomings, the existence of which were more or less unknown, or quite ignored, in former years.

These reports are accessible to all, as they are to be found in the library of this Institution. It therefore seems unnecessary to say more regarding the system on which our manœuvres are usually carried out. I would, however, direct the attention of those who have not already read it to the valuable report recently issued by the Inspector-General on the Berkshire manœuvres. I believe I am correct in saying that never in our generation has so large a cavalry body been exercised in reconnaissance in England on such an extensive scale, while the practice in the occupation of cantonments under service conditions, together with the use of field telegraphs, seem new features at such manœuvres.

Looking at the results of our cavalry manœuvres as compared with those of Prussia, it cannot be said that ours have borne fruit in the direction of new regulations and instructions for employment of cavalry. No doubt after cavalry manœuvres have become an annual occurrence in this country, we shall find that British methods of handling cavalry will be second to none, either in originality or in practical execution. Yet, notwithstanding the absence of new ideas, our cavalry manœuvres have not been unfruitful. Foremost amongst the advantages which have accrued is, I think, the estimate which they have enabled us to form as to the efficiency and readiness of our cavalry to carry out its *rôle* in war.

All leaders, too, get an insight into what is likely to be required of them and of their command in war, and can form an idea of the standard of efficiency in manœuvres which squadrons should attain, in order to be fit to act in a cavalry mass.

Von Kaehler has told us how, in a period when no manœuvres were held, cavalry training consisted solely of exercises in ceremonial parade. Von Hohenlohe also, in his "Conversations on Cavalry," comments on the same fact, and shows most clearly how the "means" in the case of the riding school came to be mistaken for the "end" in view. Cavalry horses, instead of being trained to manœuvre and charge in the open, spent most of their time there. In our time, previous to the manœuvre epoch, we have heard of officers who have acquired distinction in the art of drill because they could go through a mounted "field day," as the term is, with their whole regiment in the barrack yard. Such chess-board movements, done from the halt to the halt, no doubt show great ingenuity on the part of the regimental commander; but a regiment so trained is hardly fit for manœuvres, much less for war! On the subject of training squadrons for war I will, with your permission, quote the following remarks from a small pamphlet by von Rosenberg, who is at the present moment one of Germany's foremost cavalry leaders :—

"We must first ask ourselves : What are the most important evolutions, and with which will we be able eventually to do the enemy the most damage ?

"The simplest formations alone enable us to attack the enemy *with certainty*. For a squadron, besides column of sections, etc., for marching, we require only a column of troops, formation of line to front, wheels of troops, and advance in line. We must be simple and natural. Whoever cannot defeat an enemy with these simple evolutions will never do so with complicated half-columns. Our young soldiers in the face of a real foe more or less lose their heads, hence all our movements must be of the simplest and most natural kind. This simplicity of movement must be so thoroughly practised in peace, that those young soldiers will from force of habit, and instinctively almost, know their places. To have a squadron thoroughly under control at the supreme moment is not attained by what we so often hear called "steady drill," but only by training our men from the very beginning over fairly rough ground at the most rapid paces, over

obstacles of every kind, through woods, etc. Our troops must be trained, so to say, in a 'wild' fashion, and out of this wildness will quiet and calmness spring. Such a squadron is always reliable. On the other hand, one can never be sure what will happen in a squadron otherwise trained, if some sudden cause produces disorder in the ranks. Disorder will most certainly be produced by mistaken orders and rough ground; our men must be accustomed to pass from this state of disorder to one of order. The most perfect discipline must prevail in the ranks at the most rapid paces and when passing over difficult ground. A man must have no other thought than to ride in his place without speaking a word, and to give his undivided attention to his troop leader. It is also necessary that our troop horses be thoroughly under control, and that our men can ride in the open."

The real object of manœuvres is to accustom the cavalry to act together in masses, in strict accordance with certain ascertained rules and methods; to train it as the great pioneer force of the army in the field—the eyes and ears of the Commander-in-Chief.

The work to be carried out is, therefore, designed with a view to practising in large masses.

I. That training in reconnaissance, a complete knowledge of which should have been previously acquired in the smaller units of regiments and squadrons.

II. Drill, manœuvre, and attack.

III. Rapid concentration of the division on any given point. Fight of the division against a skeleton enemy. Exercises of opposing bodies.

Only when complete efficiency in these points is attained, and the hostile cavalry is defeated and driven from the field, will the road lie open to the carrying out of that great strategic task of cavalry in modern war—the lifting of the veil which shrouds the enemy's movement.

Reconnaissance.—Of the objects sought to be attained I take first the question of reconnaissance, and I think the experiences of recent manœuvres open up many points for thought and attention.

Military history teams with examples of how success and failure, in many of the most notable campaigns of modern times, can be traced directly to the activity or inertness of the cavalry reconnaissance. Perhaps one of the best examples of this is to be found in an article published in the *Pall Mall Magazine* for March of this year, by Lieut.-General Sir E. Wood entitled "Cavalry in the Waterloo Campaign."

Referring to Quatre Bras, the General says: "The audacity shown by Perponcher and the Prince of Orange, and a want of enterprise in reconnoitring on the part of the French Cavalry, caused Ney to imagine that the Allies were in much greater strength than was the case. He could count from the high road near Frasnes his opponents between Gemioncourt and the Namur-Nivelles road, but could not tell what troops were on the reverse slope north of that road, or behind the Bossu Wood; *though either of Piré's brigades, which were at Frasnes over night, might have learnt this, and with impunity, by riding round the British flank. Piré did nothing to ascertain this important fact,* and Ney, with a personal

knowledge of Wellington's skill in concealing troops on defensive positions in Spain, would not advance until Foy's division arrived at Frasnes about 2 p.m."

Calling to mind our most recent experiences of reconnaissance in peace manœuvres, viz., the work carried out in Berkshire on the 2nd and 14th September of last year, I ask, Do the results justify us in a belief that we give sufficient time and attention to this most important subject?

The official report of the Inspector-General comments, at some length, on our deficiencies in this respect.

What first seems to me to require closer attention is the instruction of patrol leaders, and in connection with this I wish to refer particularly to a few paragraphs on page 25 of the Confidential Report (by Captain D. Haig, 7th Hussars) on the French Cavalry Manœuvres of 1893. Under the heading "Instruction in Reconnaissance" there is a detailed description of the course of instruction through which non-commissioned officers of a squadron of French Cavalry have to pass, under one of their own squadron officers. No doubt many here have read it, and I think all who have done so will agree that something of the same kind might, with great advantage, be adopted in our own Service on a regularly laid-down uniform system throughout.

The only regulation at all analogous to this in our Service is to be found in the authorised "syllabus" for the annual "military training" (Cavalry Regulations, Part IV., page 554). In this something like three or four days are devoted by the entire squadron to work, for which in the French Service twenty-seven working days are considered necessary for non-commissioned officers alone. I do not mean to assert that something more than the work during military training is not often done in our Service, but I venture to think it should be laid down as a matter of regulation, to be carried out uniformly by all.

As regards the movement of reconnoitring bodies, the method of advancing by "bonds successifs" (or "sprungweise," as the Germans term it), which is also described on page 24 of the Report just referred to, deserves careful consideration and practice. Moreover, it appears to be an error, and one which may lead to great mistakes, if those responsible for the instruction of our cavalry officers remain satisfied with practising our officers in simple *tactical* reconnaissance exercises. Training in *strategical* reconnaissance requires different measures to ensure success. Officers must first of all be thoroughly instructed in their duties theoretically. Afterwards, special exercises on an extended scale in the field should be carried out something after the style of the following two schemes, which I take from a book recently published by General von Pelet Narbonne on the training of cavalry.

Time does not admit of my going through these schemes in detail. The points to be noted are that the exercises were carried out as much as possible under Service conditions. Patrols, consisting of nine to fifteen men (each under an officer) were sent out from skeleton squadrons, the supporting bodies were also represented by flags. Each patrol carried a telegraph instrument for utilising the public wires, which were placed at

the disposal of the troops for the three days during which the exercises lasted.

Patrols were thus exercised in reconnoitring ground and troops, in crossing rivers, in use of telegraph and transmission of reports by orderlies, in destruction of railways, and in occupying bivouacs under Service conditions.

We are told that patrols covered 250 to 300 kilomètres (160 to 190 miles) in the three days.

During the past drill season similar manœuvres, but, from force of circumstances, on a smaller scale, were carried out by General Keith-Fraser at his inspection of regiments in reconnaissance. At the end of October the cavalry regiment at Windsor moved with the Hounslow regiment from the line of the Thames against the two London regiments, which were located in outposts near Harrow. Special missions for destruction of railway and reconnaissance of ground and troops were also directed to be carried out. The cavalry regiments at the Curragh were similarly exercised, while at stations where single regiments were quartered, wings of regiments were exercised as opposing forces.

It thus seems that during the last season a great advance in reconnaissance *inspection* has been achieved.

Drill, Manœuvre and Attack.—In the various exercises which prepare masses of cavalry for the fight, the annual manœuvres exemplify perhaps their principal necessity and value.

Divisional drill and manœuvre are designed to train the division for the fight, more especially in qualifying subordinate leaders of lines, regiments, and squadrons for successful leading of their commands in line tactics, by stimulating rapid, mutual understanding between leaders, quickness of eye in rapidly grasping the situation, and arriving at immediate decisions.

A clear distinction must always be drawn between "drill" and "manœuvre," and it is a question worthy of serious consideration whether the greater portion of the time at disposal should not be devoted to "drill."

But by "drill," be it understood, we do not mean to imply that our division or brigade is to be exercised as if the squadrons were pieces on a chess board, and that complicated movements of an ingenious nature should be practised at a slow pace. Drill should consist of many evolutions of the simplest kind, rapid deployments from mass to a fighting formation in any direction; long advances at varied paces over every kind of ground, followed by a charge, break-up and rally, and perhaps another charge; and it should be borne in mind that the object on which the charge is to be made should be invariably indicated; first of all that object may be stationary, but finally it should be a moving one. Men with flags or discs are employed for this purpose. By this means much instruction can be given as to the handiest methods for attack, or to parry an enemy's attack according to the nature of the ground. The following diagrams illustrate my meaning in the case of flank protection.

Similar cases should be worked out to suit varying circumstances.

I am strongly opposed to the idea that inspiration will teach us at the last moment what formation to employ. It seems more practical to work out as many cases as we can; subordinate leaders will then get a better idea of what is required of them, and what evolutions the efficiency of their squadrons will justify them in attempting.

I would call attention to the advantages to be gained in instruction from the use of single-rank formations. When drill ground and strength of establishment admit, a regiment can be formed as a brigade. Leaders thus get practice in leading higher units than they would in regimental parades.

In the drill of the division it is perhaps needless to point out the vital necessity for constant attention to "pace" and "direction." Those of us who have had experience in divisional exercises know well how difficult of attainment is proficiency in these respects, and how all-important is their correct performance in the cavalry fight.

A most important question is the choice of the moment for full deployment into a fighting formation.

A too early deployment sacrifices the full power of manœuvre, discloses one's intentions, and abandons advantages of ground for cover. A late deployment means risk of surprise.

Correct estimation of space and time is most necessary for every cavalry leader, but more than any for the divisional commander.

The disposition of the lines of a division deployed for manœuvre previous to the attack, the *rôle* each has to play under constantly varying circumstances of ground and hostile dispositions, are matters of the greatest moment to secure success in the fight, and imperatively demand constant attention and recurring practice.

The number of squadrons to be placed in first line must depend on the ground, and on the known or estimated strength of the enemy.

Frederick was in favour of the strong first line. Napoleon, an artillerist, had not the same knowledge of the details of cavalry tactical manœuvres. The French Cavalry was thus weak in power of manœuvre, and Napoleon hoped, by means of masses and successive lines, to make up for this want of training, and so to discount the victory of the first line of an adversary.

There are, however, many disadvantages in a strong first line. It is unwieldy, and it often happens that squadrons sent to reinforce it may be badly wanted elsewhere. The nature of the ground will also very often only admit of small fronts.

All who have experience of divisional manœuvres must allow that what, more than all, requires constantly recurring practice, is the conforming of the second and third lines to the movements of the first, and the intervention of the former, sometimes by flank attack, sometimes by flank defence in support of its attack. Nothing is more urgent to insure success than the skilful and intelligent handling of the second and third lines, and of all the operations of a cavalry division none present greater difficulties, or demand such constant practice.

Following out the same plan of instruction, cavalry should be trained to form rapidly for attack on infantry and on guns. The form of attack

by a cavalry division on infantry which seems now to find most favour is, briefly, as follows :—

The division (three brigades) moves in a triple column of troops, opposite the point from which the attack is to be delivered.

On reaching this point each brigade wheels into line, and four successive lines are formed, 200 yards distance between each. The two outer regimental wings of the leading brigade in extended files form the leading line, the two inner wings moving with closed files and ordinary squadron intervals, each wing covering one flank of the leading line forms the second line. The other two brigades, moving with closed files and ordinary intervals form respectively the third and fourth lines.

The article in the *Pall Mall Magazine* previously referred to contains very realistic details of the exploit of the French Cavalry in attacks on infantry at Quatre Bras; and the splendid success which attended similar enterprises of the Austrian Cavalry at Custozza, when fifteen squadrons held in check thirty-six battalions of infantry throughout the day, and three troops of Uhlans rode through one brigade of infantry and dispersed another, has been fully described in a paper by Lieut.-General Sir E. Wood, to be found in the Library of this Institution. On the other hand, the Plevna campaign affords us a striking instance of inactivity and want of enterprise of cavalry acting against infantry. During that four days' hard fighting which resulted, on the 12th September, 1877, in the repulse of the Russians, fifty-five squadrons and thirty-five guns of the latter looked on from beyond the Vid—and this despite the fact that many enterprises against retreating infantry were successfully undertaken by the small force of Turkish cavalry (half of it irregulars) at the disposal of Osman Pasha. An Englishman[1] who was serving with the Turkish Army thus comments upon the subsequent performances of the Russian Cavalry :—

"8,000 horsemen (with several batteries) splendidly trained and equipped, operating in a country favourable for cavalry as that west and south-west of Plevna undoubtedly is, and occupied by a population three-fourths of whom were friendly, and kinsmen in language and religion, failed to intercept two columns, one of seventeen, and one of twenty-one battalions, each hampered by a train ten to fifteen miles long."

Time will not allow me to go further into these important details than to claim one more advantage from manœuvres of large bodies, viz. :—The training of gallopers and practice in transmission of orders—by no means a slight matter. Much more could be brought forward, but I have said enough to prove the necessity which exists for constant practice in drill and manœuvres of the full division with artillery and machine guns on varied ground, in order to maintain leaders and troops in a fit condition for the field.

Concentration for the Fight.—Coming now to the practice of concentration for the fight on a given point where the enemy's main force is found to be, the use and value of manœuvres of large bodies of cavalry is

[1] "The Defence of Plevna, 1877." By W. V. Herbert. London: Longman and Co. 1895.

exemplified in a striking degree. When we consider the extent of ground covered by a division disposed for reconnaissance, especially in an open country like the Berkshire Downs and the plains of Muridki and Aligurh, we must realise the importance of constantly recurring practice. General Luck considered this exercise of such vast importance, that in all his manœuvre camps, at least two or three times, he caused the division to concentrate in this manner, some squadrons having to traverse many miles to reach the rendezvous; and at his last camp, at Muridki, in January, 1892, he expressed his opinion that the practice of previous years had culminated in satisfactory efficiency in this respect.

I think many of us here have had practical experience of the necessity for constant practice in this matter of concentration.

Fight of the Division against a Skeleton Enemy.—Following the practice of concentration comes that of the manœuvre and attack of the division against a skeleton enemy. This is most useful and instructive, as illustrating in a practical manner the object sought to be attained by the drill and manœuvre exercises of previous days.

It is needless to say more, as an example of such exercise is to be found in full detail, with explanatory sketch, on pages 42 and 43 of the Inspector-General's Report on the Berkshire Manœuvres of last year.

To complete these valuable exercises, it would be of great advantage to carry out pursuits of various kinds, and under every variety of circumstances and ground; and in mentioning the subject of pursuits, I would particularly draw attention to that most important duty of cavalry in war, viz., the pursuit of a defeated enemy after a general engagement, and the necessity for a far-reaching reconnaissance by the cavalry towards the close of a successful battle, to enable it to keep touch with the retreating enemy, and reap the fruits of victory.

Exercises of Opposing Bodies.—The exercises of opposing bodies, with which it is customary to culminate the annual manœuvres, are, undoubtedly, of great importance. Their real value seems to me to lie in the fact that two forces, posted many miles apart, approach one another under conditions which illustrate an intelligent, warlike situation. That they reconnoitre and report on each other, with a special object in view, the correct fulfilment of which must bring them into contact in some part of the ground unknown beforehand to either. Thus each leader finds himself confronted with the solution of a problem, the conditions of which arise suddenly, and have reference to the adaptation of his troops to the ground upon which he finds himself, and to all he can see and hear of his enemy's disposition. This demands on his part a thorough knowledge of manœuvre as applied to any kind of ground, ready resource and prompt action. Commanders of lines, regiments, and squadrons have opportunities of displaying intelligence and initiative in carrying out the plan of the General, and mutually supporting one another, and thus that "rapid mutual understanding" between leaders and subordinates, spoken of by General von Schmidt as so all-important in the cavalry fight, is fostered and realised in a manner which such exercises alone render possible in peace time. The proceedings of both

sides are carefully watched by the director of manœuvres, assisted by an experienced umpire staff, and mistakes made not only by commanders, but by all leaders, are discovered, noted, and commented upon with a reality which would be impossible in an ordinary drill or manœuvre against a marked enemy.

Horse Artillery and Machine Guns.—I think the system of annual manœuvres has given us most valuable experiences in the important subject of the combined action of cavalry with horse artillery and machine guns.

And, first, let me notice a statement recently made on this subject by a very able lecturer at Aldershot, whose opinion on all military subjects is of value, that no historical examples exist by which we can judge of the practical use of H.A. with the cavalry division. I am not prepared to deny this; and, coming from such a speaker, we must allow that, if any examples of such action do exist, they must be somewhat obscure. What I fail to see is, why this argument should apply to guns of the present range and calibre. When the field of action of H.A. was confined to a range of some 500 or 600 yards, it is quite conceivable that their action could have exercised but little influence on the course of a cavalry combat; but, surely, it is quite another thing when the same or greater results can be attained at a range of over a mile or more. Their field of action is immensely extended, and in this respect the improvement in artillery has rendered it a far greater power to cavalry.

During the fight, the officer commanding the artillery—like all other leaders of units—must not hesitate to act at once on his own initiative. when he sees the necessity for doing so. He cannot wait for fresh orders.

The highest standard of technical training is demanded of horse artillery. The greatest mobility is required, coupled with ability to produce a great fire effect in the shortest possible time.

Only under these circumstances can cavalry get real value from the support of artillery.

Whilst I do not for one moment hold that at any period or phase of the cavalry fight the principal arm will ever fulfil a subordinate *rôle*, I still think that the artillery position will often influence the direction of the attack. The deployment of the division must be made with a view to the co-operation of the artillery, and, with this object, a wide movement on the part of the cavalry is advisable.

The divisional commander will often have to decide the question of the necessity for detailing an escort for the guns. The principle should never be lost sight of, that every available man is required for the cavalry fight. If that fight is lost, so will the guns be lost. A small party for reconnoitring purposes must, however, always be left for the guns.

Prince Frederick Charles gives it as a principle that there should be no special artillery escort.

If historical examples do not furnish us with material to judge decisively of the actions of horse artillery with cavalry, we have, at any rate, the writings of practical men who have seen much cavalry fighting to guide us in forming sound ideas on the subject. General von Schmidt,

in his "Instructions for Cavalry," explains most clearly his opinions—ending his remarks with the statement that horse artillery, if worked on sound principles, "will materially assist the action of cavalry without hampering its movements." General de Gallifet, in a well-known work, generally attributed to his inspiration, entitled "Cavalry in Modern War," writes in a similar sense. Whilst all who have read General de Brack's writings, must feel that his immense experience of war taught him to be far from indifferent to the value of horse artillery with cavalry.

I think the experiences of past years are not wanting in many valuable lessons on this important subject.

What has appeared to me most important is the necessity for more constant practice in the combined manœuvre of the two arms to bring about harmonious action and mutual support. General von Schmidt lays great stress on the necessity for batteries taking up a position rapidly and judiciously, and *remaining in it for a long time;* he also lays down the principle that this artillery position should be a point upon which the cavalry should manœuvre, and says that the effective action of horse artillery lies in the ability of its officers "rapidly seeing the right moment and directing their fire on the proper spot."

It will be allowed that if we accept these ideas as correct and sound, the experience of peace manœuvres should teach us that we have something to learn in this respect.

I hope presently some artillery officers will favour us with their views on this subject, especially with reference to the new pattern gun which was used last year in Berkshire.

Machine Guns.—The most valuable acquisition which modern inventions have conferred on cavalry is machine guns. I think we have hardly yet realised what invaluable assistance and support their great mobility and rapidity of fire will render a cavalry force in the field. There seems to be considerable diversity of opinion as to the proper way of using them; and I hope we may presently hear some expressions of opinion on the subject.

Personally, I do not think that in the fight of the brigade or division they ought to be given a sort of independent "roving commission," as we sometimes see them used. They must be united under one command and form in themselves a distinct unit, destined to take its proper place in harmonious action with the cavalry and artillery. But, like all units in the cavalry fight, the machine gun detachment must be accorded the exercise of an intelligent initiative. Whilst it is not necessary or expedient that they should always as a principle be kept near the artillery, their best position will, I think, often be found in that flank. It is of paramount importance that the manœuvres of the cavalry should not be hampered, which must often result if lines of fire are multiplied and divergent. I feel sure that the addition of machine guns will add enormously to the power and use of cavalry in war.

Finally, if I may once more look to a foreign country for a lesson in manœuvres, I will venture to say that no better example can be found of the great object for which cavalry training and manœuvres are a prepara-

tion, than the work done last year round Ballassa in Austria-Hungary by the 5th and 18th Cavalry Brigades in the manœuvres of the IV. and VI. Army Corps, a description of which—perhaps of especial value to the cavalry officer—has been so ably given by the *Times* correspondent and since reproduced in the JOURNAL of this Institution.

Amongst the many advantageous results which have accrued from these annual cavalry manœuvres, discussion has been aroused and consideration directed to our existing cavalry organisation and system. We soldiers and sailors, with our leaders, are so bound down by politicians crying aloud for retrenchment and economy that suggestions for improvement and reform are generally rendered most difficult of attainment; and all of us who have the true interests of the cavalry at heart cannot but feel deeply grateful that, in spite of these obstacles, such opportunities for greater efficiency as are afforded by annual cavalry concentrations have been, and continue to be, provided. We who are not, like our Headquarter Staff, in immediate and daily contact with civil and political authorities, do not perhaps sufficiently realise the difficulties to be encountered and overcome to carry out improvement and reform.

Cavalry manœuvres have, however, undoubtedly brought certain failings to light. Both here, and in India, manœuvres often show that there is a want of a sufficiently uniform system of training and instruction, which can only be attained by a more extended brigade organisation and the maintenance of units more nearly approaching a war strength. The result of such defect is shown at these camps, when nearly one-half of the invaluable time has to be taken up by brigade drill instead of extended reconnaissances, practice of concentration, divisional drill, and manœuvre for the fight. And yet, under the circumstances, it has always been impossible to avoid this, because regiments do not come so well prepared in brigade work as to obviate the necessity of giving up more than one or two days to it.

I venture to offer as a primary subject for discussion whether a great deal more could not be done, and greater efficiency attained, under a different system of organising and distributing the cavalry in the United Kingdom and in India.

Conclusion.—In conclusion, I would strongly urge for consideration and discussion the absolute necessity for annual cavalry manœuvres. When we consider the universally acknowledged value to an army in the field of a powerful highly-trained cavalry, can any thoughtful soldier doubt this for a moment—more especially having regard to the comparatively trivial cost they entail upon the country?

Power of manœuvre and highly-developed mobility in formed bodies, combined with complete efficiency of detachments in the performance of reconnaissance and detached duties are, to the cavalry service, analogous to that which, in the other arms, is called "fire-power" and "fire-discipline."

The plains of Berkshire and Wiltshire are equally important as training grounds for war with Okehampton and Bisley.

The question of available ground alone presents a serious difficulty,

but surely—in view of the vast importance of the object to be attained—this can be got over. I hope there may be some officers present who can say something on this subject.

I believe I am right in thinking that Berkshire will be available every two or three years, and that the acquisition of equally suitable ground is only a question of distance, which, of course, means additional expense; but I think we have reason to hope that if manœuvres are organised and carried out on the same economical principles which characterised those of 1890 and 1894 the small additional cost will not be allowed to stand in the way of the attainment of such satisfactory results.

Colonel GRAVES: I should very much have preferred to have followed some more experienced soldier than myself in opening a discussion of this kind, but I have something to say in connection with the point that the gallant lecturer has put forward as the primary object of discussion. Before, however, touching on that I think we may, as an audience, congratulate ourselves upon having such a wonderfully good maiden effort as has been presented to us by my friend Colonel French, in his first lecture at this United Service Institution. We cannot help but notice that he has quoted very largely from foreign authorities, and I think we cavalry men ought to feel very strongly that it is about time that lecturers in this Institution should be in a position to quote as largely from British authorities. He has noted and referred to the report by our excellent Chairman, and I am bound to say that, of all the literature on cavalry subjects that I have read, that particular report holds a unique position. It seems to me to be a perfect epitome of instruction and direction, showing us what ought to be done and what ought to be left undone, what ought to be and what ought not to be, in plain and simple language—language easily understood, and language which is thoroughly and absolutely correct. I think that we cavalry ought to congratulate ourselves upon having something that we can now look to as a sort of *vade mecum* in all cavalry work connected with these extended manœuvres. Now, in connection with our cavalry literature by British officers, one must not overlook the writings already quoted and referred to by our lecturer—those of Sir Evelyn Wood. I am sure none of us cavalry men harbour any ill-feeling for the part that he has taken in pushing forward cavalry interests. Although for the major part of his life wearing the infantry uniform, I think we all realise and feel that under that infantry uniform there breathes the spirit of the good old 17th Lancer officer; and I think his writings, while not given as instructions in detail, are given as a method to promote emulation—to stir us up to do better than we have done. As regards the lessons to be learned from the cavalry manœuvres, I think the lessons with regard to our shortcomings ought to take the first place in our minds at such a meeting as we have to-day. I think they show above all things our weak point, and they show the necessity of acting, so to speak, rather in a humble spirit, and submitting to the castigation that we have received very freely at the hands of some of our friends in the Press. We must admit we have many shortcomings. Some of those criticisms have been rather drastic; some have been very severe; some have been very kindly; some of our critics have shown the *fortiter in re*, perhaps, and rubbed our backs up a little bit; some have shown, on the other hand, the *suaviter in modo*; but one or other they have all tended to do good, for they will stir up our spirits to work harder in the direction required. I would ask, What are the main purposes of extended cavalry manœuvres? First of all, they are not intended to fit us to cope with such enemies as Soudanese, Zulus, Boers, and so on. They are meant to put us, in the main, on a parity of footing with foreign countries in Europe. They are meant to train us on the same lines that their cavalry divisions are being trained upon, and I think that point ought to be carefully borne in mind. Our lecturer has

put two points for discussion specially before us—first of all the necessity of yearly cavalry manœuvres. I do not think myself that that point requires discussion. I think it is an obvious necessity, and we cavalry soldiers all feel it to be an obvious necessity. But he puts forward also for primary discussion the question of organisation and distribution of our cavalry in the British Islands with reference to the work to be done in these manœuvres. I do not think he could have put forward a more important point, for I base nearly all our shortcomings at the beginning of these manœuvres, and which are gradually improved away as time goes on, upon the shortcomings of our system of distribution and of organisation. To look abroad, we do not find in Germany such an anomalous thing as a cavalry regiment of some 225 horses. I remember the time when I commanded a regiment of 225 horses, and I never felt so small in my life. I remember, at that time, an order coming out that I was to go from Norwich to Manchester, where we should have been further distributed with a big squadron at Abbassiah, and another squadron at Liverpool, I found myself in command of the band and a few horses, old soldiers, and some ricketty recruits. I pointed this out to the Adjutant-General, the result being that I was sent to Aldershot. Here is another weak point in our system. I was raised from the basis of the lowest peace establishment of 225 horses, and within a week I was put on paper as at full war strength. What was the result? Within my two years of command I had to put 533 recruits through the mill, and I do not know how many horses. This shows an inherently weak point in our system: there ought to be no such possibility of a jump from such a low establishment to such a high establishment. Such a thing is not known in Germany. In Germany there are five squadron regiments. War is declared, and mobilisation ordered: four squadrons take the field at once; the fifth squadron receives the sick, lame, and lazy, the old and young horses, and those of the Reserve men who have only left their regiments within six months are drafted to that squadron. I say I candidly believe at this moment that, of the many hundreds of Reservists who have left my regiment since the time I took command of it and gave it up, I do not believe a single one has been on a horse, unless it has been in civil employ as a groom. It is presumed, I believe, that these Reservists should join the troops going on service. This is another weak point in our mobilisation. Again, with regard to numbers, we have 106 men, rank and file, per squadron. We have 424 horses per regiment, in a division we have 2,544. Russia, in regiments of the line, the squadron, instead of 106, is 143; in the Guards, it is 143; in Germany, 135; in Austria, 146; in France, 133. Regiments, instead of 424 horses, in Russia it is 859; the Guards, 572; Germany, 540; Austria, 870; France, 665. Again, in the division you have in Russia 3,432; in the Guards, 4,004; in Germany, 3,240; in Austria, 3,504; in France, 3,902; and we have 2,544. What does this mean? It means that if we have a regiment out providing a contact squadron, if we have that regiment supported by a brigade or division, each squadron that comes into contact with our opponents' squadron will be outnumbered on the average something like thirty to forty sabres. It means, further, that each regiment that comes into contact with an opposing regiment of any of those countries will be outnumbered by some hundreds. It means, further, that if we have a cavalry division opposed to one cavalry division of any of these Powers—supposing we are allies with some other Power—it means that that cavalry division of ours will be outnumbered in rank and file by no less than an average of 1,000. Surely such a system of organisation is weak on the very face of it, and ought to be improved. As the Inspector-General, in writing to me, asking me to be present to-day, said in his letter, our authorities want to be shown that a squadron of eighty sabres and regiments of 300 horses are ridiculous. They are ridiculous, but I believe very firmly our authorities have awakened to the fact; and, to cut the ground from under criticism of this statement, I would quote the words of His Royal Highness the Commander-in-Chief, on the 17th April, in the year I read a paper at this

Institution. He said: "There is great disinclination among the authorities to have cavalry. That is an economical question—a question of £ s. d. I only hope that so far from there being a reduction made in the cavalry, there may be a very considerable increase in the force, not in regiments—that is to say, not in the number of regiments, but in the establishment of regiments." Now, what the Commander-in-Chief said and expressed as his opinion, I take leave to believe is also the opinion of the Adjutant-General and the Quartermaster-General, and of others who are in authority on the staff of the Commander-in-Chief. This question of our organisation is so tied up with our barrack accommodation, that whatever improvement there may be in the future must be necessarily slow, with reference to our distribution of cavalry in the small stations. We have twenty-one regiments with sixteen headquarter stations, twenty-one detached stations—detached all over the country, doing police duty, as I said, one day not very long ago, a remnant of mediævalism—doing police duty and nothing else—and so mixed up with our organisation that, until the two systems are altered, we cannot expect regiments to go to cavalry manœuvres and commence, as they should, by doing their work in the proper way.

Colonel WALLACE: Having had the honour and privilege of attending the manœuvres last autumn, held under your auspices, Sir, I can strongly endorse what our lecturer has so well brought out as to the necessity of these cavalry manœuvres. I think from a horse artilleryman's point of view it is necessarily more important for these manœuvres to be annual than even, if I may say so, for the cavalry. In our existing organisation an officer only spends a few years in each rank of the horse artillery, therefore the probability that he ever has the privilege of being at these manœuvres is remote. If the manœuvres are only held once in three years, how much more remote will his chances be! My only way out of this difficulty is this: We live in an age of courses. In addition to the veterinary course, we have the bread-and-meat course, the range-finding course, and the Okehampton course. We should have a cavalry manœuvres course, and my difficulty for that is to find an instructor. If no officer at present is available, I think the Press might supply us one from the critics. I think it would be more beneficial to us if we were told our faults in private, than if we had to wait to get the daily paper and read at breakfast of our errors and delinquencies spread before the world. In the one case, we know that our delinquencies are summed up after the end of the manœuvres, and they certainly look very black. I think also another objection to our waiting till the end of the manœuvres is that we cannot remedy these faults. If they were pointed out by the instructors in the field, perhaps we might learn how the manœuvres ought to be conducted. I should propose that the leading journal should be called upon to find the first chief instructor, and I think members of this Institution would agree with me that there could not be a more able instructor. But before he goes to the next cavalry manœuvres, I want him to go and see a little machine-gun practice. I was present the other day at machine-gun practice, one machine-gun manned by mounted infantry, picked shots, and the other by a cavalry regiment. The first target was at 1,000 yards, and represented four cavalry soldiers, if not six, as large as life. The target was stationary, the range was known. The officer in charge of the detachment had field-glasses and telescopes. They fired, first deliberately, and then rapidly, 250 rounds. The mounted infantry got no hits. The cavalry at 1,000 yards with the same gun got three hits. They went to 500 yards, and the mounted infantry shooting deliberately, watching the effect of each round, fired 250 rounds, and got seventeen hits, while the cavalry got thirty-two. I think our chief instructor will not be such an advocate for machine-guns, and, perhaps, he would excuse you, Sir—although he found fault with you the other day for not using machine-guns—if he had been present at this practice. I think watching this practice was, perhaps, more beneficial than being on the Berkshire Downs, in 1890, and seeing machine-guns galloping about independently, firing blank cartridge, and nobody taking any notice of them.

Major-General COMBE, C.B.: I think it has been generally admitted that cavalry manœuvres of some sort are an absolute necessity to train and maintain both leaders and troops in a condition fit for war. But my personal opinion—and I think it will also be generally admitted—is, that it is the senior officers who benefit most by these big manœuvres, the aim and object of which is, as Colonel French has observed, to qualify line leaders, regiments, and squadron leaders, for the successful handling of their commands in line tactics. As regards the junior officers and the rank and file, we have in England to face the fact that these large manœuvres are now the only opportunities that many or most of our regiments ever get of drilling in brigade or working in the open. It is found in practice that regiments come to these manœuvres so unprepared in brigade drill as to necessitate much valuable time being taken up in what may be called elementary drill. This, of course, is to be deplored, but the question is, How is it to be helped? I am afraid the provision of larger and more numerous grounds in the *immediate* vicinity of the towns where most of our regiments are quartered is out of the question, and with all due deference I would suggest that, in lieu of these large concentrations being held every year, the Service at large would benefit more by numerous small district concentrations in which every regiment in the United Kingdom would take part and have an opportunity of drilling in brigade and working in the open. Larger cavalry combinations might be held every second or third year, and I am quite sure that then, regiments and brigades would be found to come much more fitted in every way to take part in the large manœuvres. Colonel French states in his paper that "the most valuable acquisition which modern inventions have conferred on cavalry is machine-guns." I confess I am one of those who have "hardly yet realised what invaluable assistance and support their very great mobility and rapidity of fire would confer upon cavalry in the field." From what I have seen of these machine-guns, I am myself inclined to think that their mobility and rapidity of fire will both have to be considerably improved, before it can be truly said that their help will add enormously to the power and use of cavalry in the field.

Captain J. M. GRIERSON, R.A.: I should like to say a word upon one point mentioned by Colonel French, and that is the employment of horse artillery with the cavalry division. The point is, What is to be the *rôle* of the horse artillery in the initial stages of an action? Is it to be the pivot on which the cavalry division would be working? Of course, it is not for me to say what cavalry should do, but it seems to me as rather exalting what is, and must be, an auxiliary arm to the cavalry into the position of the principal arm. The principle which I think most horse artillery officers are trained to go upon is, that the object of their fire is not the enemy's artillery but the enemy's cavalry, and they can best support their own cavalry by firing on that of the enemy. But the enemy's guns have long been a favourite bait for artillery; I can give an example from my own experience at foreign manœuvres. A certain general officer of cavalry, who bears a very high reputation, was one day standing with his division, and was using very strong language because there were no reports received from the advance squadrons as to the whereabouts of the enemy's cavalry division. He was getting impatient, and he ordered one of his horse batteries to come into action. "Where shall I fire?" "I do not care; bring the battery into action and fire." And they fired into the blue. About a mile-and-a-half away another gun replied. "Ah!" he said, "there is the enemy; I knew no horse gunner could resist that." That was not very long ago, but I think it won't occur again; and I trust that the horse artillery will take their proper place in support of cavalry, and that all their efforts will be given to firing on the enemy's cavalry, and not on the enemy's guns.

Major ST. JOHN S. TAYLOR: The lecturer mentioned that the manœuvres of the cavalry in India were initiated by Lord Roberts. Now we had manœuvres at a Camp of Instruction in India in 1871, at Delhi, under the

personal superintendence of the Commander-in-Chief Lord Napier of Magdala, and the next year there were thirteen regiments of cavalry in division long before these manœuvres, which were mentioned by the lecturer. At that time the division was formed into brigades, and each of those brigades had three weeks' practice before it was taken into the large manœuvres; and I believe at that time it was essential, because none of the regiments had ever been in brigade. The brigade comprised one regiment of European cavalry, and two of native cavalry. This native cavalry had scarcely had any practice whatever in any brigade formation—in fact, I do not suppose they had ever been in brigade before. But after three weeks' hard work, the brigade was fit to go into any division work. With reference to the practice of brigade drill in single rank, I may say before our regiment, the 11th Hussars, went into camp at Delhi, the Colonel (now Lieut-General Sir Charles C. Fraser) formed the regiment into a brigade in single rank, and thereby gave the regiment every opportunity of knowing brigade drill up to the point at which it was known in those days, and we had great advantage from it. I do not know whether it is precisely the lecturer's idea, or that of some other officer, that the great thing for squadrons to be trained is to begin their training over very rough ground, and at a very rapid pace. My experience of drilling cavalry is that you must first begin by doing everything very slowly. You must teach each man his place in the troop, and squadron, and regiment. You cannot push men along rough ground, and then expect them to go into a charge, boot to boot, as they should do; they must have time to be drilled properly, and to be quiet in all their paces. I am very anxious to combat the idea that you can drill cavalry soldiers quickly in that way, and well. I should also like to mention one thing, viz., I cannot understand that the artillery should take up a position, and that the cavalry should work, as it were, with reference to the position they have taken up. My belief is that the cavalry are the first thing in this particular work of the cavalry and artillery, and that the cavalry commander should show the position he is going to take, and that the artillery commander should take his position accordingly. I cannot understand that it is well for the cavalry to take a large detour for the purpose of giving the artillery a position.

Captain SELDEN LONG: I was asked to come here on account of an article published in the *Times* on the 16th instant, with regard to the expenditure on the late cavalry manœuvres. That article found a great deal of fault with "doing the manœuvres on the cheap," and put the blame on the Inspector-General of Cavalry and those officers who were working on his staff and assisting in administering the expenses. I was one of those officers. As far as the remarks on expenditure go they are, I must say, entirely misleading. In order that gentlemen present who may not have troubled their heads much about military finance may understand the matter, I might briefly explain to you the general course when the General Officer Commanding a district or division is ordered to hold manœuvres. He not only is informed of the total sum of money placed at his disposal for the purpose of manœuvres, but he is on broad lines informed on what and how he may expend that money. He is told it is the cost of bringing troops to and from the ground, of billeting or otherwise, the cost of damage to land, of hiring camping ground, of extra provisions, fuel, water, forage, etc. Also the cost of providing a lunch for the entertainment of those occupiers and owners of land who are good enough to allow the troops to go over their land. This in addition to the charge for washing and camp equipment, practically embraces all that he is allowed to expend; but as for imagining for one moment that the General Officer Commanding is allowed to depart from the Regulations, there is no more absurd idea that could be entertained. He has no authority whatsoever. The article in question queries many points which, with your indulgence, I should like to take in detail. First of all it queries the estimate. It says the estimate must be very wrong. To any

officer who would like to inspect it, or the *Times* correspondent himself, I should be most pleased to show the copies of the original estimates. As regards the price of bread and meat, they were worked out as well as everything else. We had a very considerable surplus over what we estimated as damage to land. We estimated that at £450, taking as our guide the experience gained at previous manœuvres, but we actually had a very small damage bill. Why we had such a very large surplus was, first of all, that we had not to pay for the carriage of stores to and from the ground—something like £100—because they were already there, having been required for the Home Counties' Volunteer Brigade, training under Lord Wantage. Secondly, we had no washing and camp equipment, for the same reason that it was already dealt with by the Volunteers. Thirdly, we had no billeting to pay for, as, owing to the kindness of Mr. Hargraves, we had a more central rest camp and saved the billeting of some of the regiments. Also up to the last moment it was thought it would be necessary to bring a regiment from a considerable distance, a five or six days' march, which would necessitate five or six days' billeting, and would cost about £50 a day, which would have come to £500 or £600. The savings over forage which were made, because you all understand that the £2,500 granted for the manœuvres was in addition to the actual cost of the troops had they remained in barracks, came to something like £1,140, owing to some lucky contract which the Inspector-General was able to enter into for the purchase of hay in the county itself, paying £1 5s. a ton less than the Aldershot price, therefore saving that money, and also saving a large amount in the purchase of straw, which costs £4 16s. a ton at Aldershot. Horses in the field did not require it, and that money went to the credit of the manœuvre vote; but as a matter of fact, until a considerable time after the completion of the manœuvres, owing to disputes between the Inspector-General of Cavalry and the War Office authorities as to what should be the basis of calculation, we could not tell exactly what our surplus was: we knew we had a surplus. They said it was only some few hundred pounds; we said it was a surplus of £1,300. As a matter of fact, they allowed £1,300, and gave it as right as far as the Inspector-General of Cavalry was concerned, because they said the price of their forage at Aldershot was cheaper than Aldershot itself informed us was the price. That, I think, will explain to you that our estimate was not quite so wrong as the *Times* correspondent makes out. The *Times* correspondent suggests, secondly, that we should have spent all the money on the manœuvres. First of all, in prolonging the manœuvres, we could not have expended the money, for as it was the weather broke up the day the manœuvres broke up; and had the troops remained, they would have had to be hastily returned to quarters. We could not have spent the money in bringing more regiments up; because there were no more regiments to bring. Few persons are aware of the tremendous amount of trouble, care, and worry that the Inspector-General took to get even six regiments. At the last moment one of them was countermanded, and it was only his personal interest that brought it there. Then the *Times* correspondent said, "Why not spend it on the ground?" Now you gentlemen, or anyone else, if they will take thought for one moment, will see that £1,300 spent on compensation for owners and occupiers of land would have gone a very little way. The German Army spent hundreds of thousands on their damage bills, and they have a Manœuvres Act. Taking the value of the production of corn or root crops in Berkshire last year, which was very well over the average, the value of a 50-acre field, with its standing crops, would have been some hundreds of pounds. I do not profess to know much about the drill, but a cavalry brigade extending over a very large tract of country would have destroyed hundreds of pounds worth, and one or two days would have swept the whole of the surplus away. Then we come to this question. The Inspector-General of Cavalry and several officers promised over and over again, as we went round the country asking permission to manœuvre, that the standing crops and root crops should be avoided, and stated that we

should compensate for any single man going over those crops. Would the *Times* correspondent have him break his word and not carry out his agreement? Again, supposing a farmer had been compensated for the full value of his crops, would he feel that he had received value? Never. When the winter came, and he had to buy fodder for his cattle and sheep, every time he put his hand into his pocket he would forget that he had been paid, and he would have said, "The cavalry came down here, but never again!" All I can say is, from my experience, I was round the district, and it was part of my duty to see these farmers and people, and never would there have been manœuvres of any kind held in Berkshire again, and I doubt whether they ever would be held as long as England has not a Manœuvre Act. The *Times* correspondent says, "Why not devote it to the benefit of the troops? Why not pay for your officers' stabling, and for replacing men's kits?" If he had made inquiries he would have found that there is absolutely no authority for so doing, and I would give you an instance. Some of the clerks were exceedingly busy, and one of them was working up until nine, ten, or eleven o'clock at night for many months before the manœuvres, and it was only on the urgent and repeated representation of the Inspector-General of Cavalry that this man got 9d. a day extra pay for all the extra work he did in addition to his ordinary duties at Aldershot. He had to apply for authority for a little extra forage for horses that were a little overworked—2 lbs. extra a day. The authorities refused to grant staff officers full allowances at staff rates, and it was only on the repeated representation of the Inspector-General of Cavalry that they were granted extra staff pay for the actual time they were out. I want to explain to you that the Inspector-General of Cavalry has no more power to pay for officers' stabling any more than he has to grant a cavalry man a pair of pants, or give him money for them from the surplus fund. Finally, the *Times* correspondent says he does not approve of manœuvres done on the cheap. I might explain for his information that all the saving the cavalry manœuvres made does not go back to the Treasury. If you look in the Army Estimates there are so many thousands of pounds for manœuvres. That money is given to the military authorities to divide how they please. If the cavalry save it, it is spent by being sent to the Colonies for the training of troops there, who have not the advantage of large home camps. Consequently, the money is spent on the training of troops. If it is saved from Aldershot or the cavalry manœuvres, it is spent elsewhere. Had the *Times* correspondent made inquiries, it certainly would have been better, instead of publishing an article which led every man throughout the Service to think that the General Commanding could have mended his pants for him.

Captain ANSTRUTHER THOMSON: I should not have risen on this occasion, had it not been for some very stringent attacks that have been made on my pet hobby—the machine-gun. I read a lecture in this Institution a few months ago, and with your permission I will quote very briefly a few details. I said that at 1,000 yards it is possible to put nearly every shot on a 12-foot target, the actual average being ninety hits out of 100 shots at a 6-foot by 8-foot target. That shooting was done at Hythe last year. In my own experience we have used a machine-gun for three successive years at musketry practice at Pirbright, and we found that in trotting up to the 500 yards range without unharnessing the horses, we were able to put forty-three shots out of sixty on to a third class target, most of them centres. At 800 yards—which was the longest range I was able to get—we could put sixty shots out of the 150 on the 6-foot by 8-foot target. That was on a very windy day. I merely mention this because people who do not know the truth may run away with false ideas. Colonel Wallace mentioned the practice done by the mounted infantry and a distinguished cavalry regiment, but I do not think they have had very much practice. From what I can learn, it was more or less like a man with a very good shot gun, who does not know how to shoot partridges, coming in without having killed one. The machine-gun must be practised. It is just as

hard to shoot straight with a machine-gun as it is with a breech-loader, unless one has had some practice with it.

Captain W. H. JAMES (late R.E.): At this late hour I do not propose to detain you very long, but I should like to say one or two words especially with regard to one point that my friend, Colonel French, brought forward in his lecture. First of all, I may be allowed to say—and I believe everybody will agree with me—that it is desirable that discussions of this character should not be confined to officers of one branch of the Service. There is a little tendency, perhaps, amongst all of us to think that we know more about our own Arm than anybody else. That is true, no doubt, with regard to details; but if you carry that proposition to a logical conclusion, you would never have a general officer in command of three arms at all, because he would not know anything about two out of three with which he had to deal. Therefore, although it is quite possible and right that technical details should be left to officers of the particular branches concerned, I think any general discussion may be taken up by anybody. There is one point I should like to draw attention to. The lecturer has spoken of the Emperor Napoleon as being an artillerist. That is perfectly true, but under the Emperor's leading a great many most eminent cavalry officers were produced—Murat, Kellerman, and Massena—I could mention hundreds whose names have gone down to fame for ever as great cavalry leaders. I do not think it would be just to infer, because certain methods of handling cavalry obtained in those days, that it follows that all others of that date were ignorant of the way in which to handle cavalry. There is certainly a concensus of opinion about one point, viz., that the present system, or rather want of system, with regard to cavalry, varying strengths of men and horses, dissemination of regiments all over the country, the impossible quarters in which many of them are placed, is bad; and that if the cavalry is to be what it ought to be that system must be altered. We are all agreed that for mass tactics, mass training is necessary, that is to say, concentration of regiments; and we have the authority of Colonel Wallace and many other artillery officers that, if artillery are to act with cavalry, they must be intimately connected with cavalry in these periods of training. One word with regard to horse artillery. The lecturer has been good enough to allude to me, in terms which I feel to be a great deal too flattering, with regard to a statement I made at Aldershot, viz., that although it is a very common thing to talk about the action of horse artillery with cavalry in a cavalry combat, there are very few, if any, pure examples of this character. When Major May gave his lecture the other day, he admitted he had great difficulty in hunting up any examples of that character, although it is true that one may find some in the old Napoleonic wars. The lecturer has said that an increase in the range of guns has given them a better field to act on in this particular instance. That is true in one sense, but it is not true in another sense, because the target against which they are to act is just as mobile as ever. It seems to me that the reason why we do not find in history examples of this kind, is that really the artillery has so very little opportunity in the sudden and rapid movements of a cavalry fight to obtain any effect at all by its fire. That is why I am always inclined to think that for these purposes the machine-gun is very largely the weapon of the future. The machine-gun is not used at long ranges, but at close ranges; it is not concentrated in large batteries, but acts in small numbers—twos and fours and something of that kind. It, therefore, presents a very small object which can be easily moved about. It is not so likely to be detected, and at close ranges you practically want no ranging whatever before firing. Of course, if cavalry—as I heard it said the other day—take twenty minutes to get into their initial position and into line, before they begin to act, the horse artillery has a great future before it. Practically, however, you must not assume that cavalry are at rest at all: they are constantly moving, and you will have a moving target to act against. Therefore, I believe that horse artillery has very little chance in this particular action. Of course, this does not

in the least do away with the necessity of having guns with the cavalry division, because they are wanted for a thousand and one other purposes. My original statement was limited to the fact that, so far as a purely cavalry combat goes, I do not think the theoretical rule would be very often capable of practical fulfilment. I should like to say one word about the question which Colonel Wallace brought forward. I am sure that those men who handled these machine-guns had not had very much practice, because we have heard about the results lately in Matabeleland, where the effect of machine-guns has been proved to be extremely good at long ranges. If machine-guns acted so well there, why should not they also act well against cavalry? I should like to say one word with regard to cavalry escort. The necessity for an escort depends largely upon which arm is speaking at the moment. It is generally put forward by cavalry that they do not want to waste their time in escorting artillery. The artillery man, on the other hand, will say, "We do not want some cavalry to escort us." In a cavalry combat, patrols are sent out simply to watch and act as scouts for cavalry, and I do not think it would be judicious to mobilise any portion of the cavalry simply and solely to act as an escort for artillery. Often, when we discuss these questions in this theatre, we labour under the one very unfortunate disadvantage, that we are nearly all of one mind. The people we have to educate are precisely the people who are not here: we have to educate the people of England into believing in the necessity of having all Arms. We know that if cavalry is not properly organised, it is not cavalry in the true sense of the word. Cavalry must be trained for cavalry. It is not the fault of our officers, but the fault of our civilian administration. Again, I thought to myself, when I read over this lecture, What of the cavalry telegraphists with three days' leave and licence? I should like to know what some of us in this hall would say if we found in the country we were unable to send a message, because the cavalry were engaged at that moment in highly-intelligent practice in the way of tapping telegraph wires. *Paterfamilias* would write to the *Times* at once. There is also another little detail I may mention. We all know that one well-known locality is eminently suited for cavalry manœuvres, but we can never get leave to go there, because of the opposition made by the landowners on account of the shooting. Until we get a Manœuvre Act, and everybody has to bear his share in the burden of training the Army, we shall always have opposition. I may be rather looking forward to the Millennium, but I am quite sure that until we convince the people of England at large that for the progress of the Army something of this kind is necessary, it is really idle to discuss detail points of this character.

Colonel FRANK RUSSELL: We have had a very interesting lecture, and we have had a very good discussion on the manœuvres, and in the course of that discussion there appears to be considerable irritation with regard to the criticism that has been made on the cavalry. I fear there is no doubt whatsoever that those criticisms have caused in the country a general impression that our cavalry is in an inefficient condition, but I think all the same we ought to be very glad that these criticisms were made, if only to call the attention of the British public to the fact of the necessity of manœuvres. An army without manœuvres is like a ship without any tar. I think the Secretary of the Royal United Service Institution, being a naval man, will understand my illustration, that an army deprived of manœuvres is like a valuable ironclad going to the bottom for want of a ha'porth of tar. Our cavalry, instead of having to bear blame on account of inefficiency, has attained to marvellous efficiency, considering the opportunities afforded it. I have had the good fortune to attend on five different occasions the German manœuvres, and all I can say is, that it is a remarkable thing that our cavalry can manœuvre in brigade at all, considering the small opportunity that they have of doing so. Until the British public are made to understand that a regiment in an out-quarter without any possibility of any extended drill, having only the chance of manœuvring

in a small field, until they understand that such a regiment is utterly inefficient for any campaign, I am afraid that our cavalry must remain in the condition it is in now. Moreover, I hope that the military authorities will bring the British public to understand that the barracks are quite behind the age. I remember, when I was in Berlin, sending, by the direction of the Adjutant-General, a sketch of the ground which was prepared in the German barracks in order to teach horses to jump. This sketch was forwarded, and an elaborate report and lithograph accompanied it; these were distributed in all the barracks in India and in this country. A distinguished officer was sent out to Germany to inspect the German barracks, in order that new cavalry barracks might be built on the same principle. The Marlborough barracks at Dublin were built immediately afterwards, and an exercise ground to enable horses to jump was made, as it was supposed, on the German pattern. I had an opportunity of going to Dublin shortly afterwards, and went to see the exercise ground, and, without wishing to make any reflection on the engineer officer, I found that he had placed large stones all along the ground intended for cavalry jumping. The consequence was that the cavalry has not been able to do any jumping practice at all, because if they had used it for that purpose they would have lamed their horses. I think the first thing to be done to bring cavalry into an efficient condition is to have manœuvres every year, and to impress upon the authorities the necessity of spending more money on the barracks. The wretched sum allowed for manœuvres in this country is quite insufficient. In Germany they grudge no money for manœuvres. I remember one cavalry charge which cost £2,000. A cavalry division went over certain ground, and that charge alone cost £2,000, and they did not grudge it. I also remember an officer when drilling a regiment separately made a slight mistake, and he charged over somebody's asparagus beds. That charge cost £500. I cannot say he got any credit for having ordered the charge, but still the fact remains that the charge did cost £500. I daresay he was censured for it, but still, there the fact is. I think Captain Grierson will probably confirm what I say, that the actual charge for manœuvres in Germany amounts to something between £100,000 or £150,000 a year for compensation of damage to crops alone. Until the British public are made to understand that, if they are to have an efficient Army, they must have manœuvres, the cavalry must remain in much the same condition as it is now.

Colonel LONSDALE HALE: I see in front of me a General of Infantry, another General of Infantry was beside me just now, and there is another General of Infantry in the rear of me, and yet not one infantry soldier has got up this afternoon to ask for cavalry manœuvres, and to plead the cause of infantry at cavalry manœuvres, so it has fallen to my lot as a foot soldier to get up and plead for cavalry manœuvres, because without manœuvres cavalry cannot become efficient, and I belong to that minority in our Army who still believe that cavalry in modern war will be just as powerful an arm on the battle-field as it ever has been. Gentlemen, I believe that a mobile cavalry, led by a man who knows the artillery and infantry tactics of his opponent, and the artillery and infantry tactics of his own side, will win just as many glories for the cavalry and as many laurels as in the past. In other words, infantry and artillery going on to the battle-field, without an efficient cavalry to help them, will be terribly handicapped in the fight. The General who has not got on the battle-field a good efficient cavalry will be fighting with two instruments instead of three, as Generals had of old, and woe betide him if he is opposed to a General with three instruments. A lot of dust is sometimes thrown in the cavalry's eyes by many writers on this subject. They tell you that the day of cavalry has passed away in the face of shrapnel and the magazine rifle; but they tell you what wonderful fellows you are in the screen! That is the phrase now, "the cavalry screen is of such enormous importance." You are told to think of your importance off the battle-field, not on it.

The cavalry screen is not one atom more important now than ever it was. Information was just as valuable before as it is now, and it is merely the device of those gentlemen who do not believe in cavalry on the battle-field, to direct your attention in the way they do to the cavalry screen. I am very much afraid that the reason why I have to represent the infantry or foot soldier this afternoon is because the British Army, as a rule, is absolutely indifferent to cavalry. They do not believe in it, I can assure you. They think that your day on the battle-field is past. And why should it be otherwise to the ordinary non-cavalry British officer? When does he see cavalry at work with the other arms? At an autumn manœuvre, may be the reply. Does he really! I have witnessed many of these manœuvres, and, as a rule, the cavalry working in combination with the other arms are only the two melancholy divisional squadrons; but the "funk" created by the announcement of the proximity of even one hostile squadron helps one's faith in the value of cavalry on the battle-field of the future. At Aldershot, single regiments, or sometimes, though rarely, a brigade takes part in the battle; but at Aldershot everyone knows along what bit of ground the cavalry must come, and, besides this, they have to keep within the boundaries. Boundaries! Fancy cavalry working with boundaries! Why, the things are incompatible — cavalry and boundaries, in these days of mobile action! You cannot have cavalry working on the field of battle if we have these miserable, close boundaries, which we are obliged to have at our manœuvres at Aldershot and elsewhere. Therefore, you must not blame the infantry officer, because he does not believe in you. He has never had the opportunity of seeing you at work, he does not know how you could help him, and he does not believe you can help him; and, therefore, he does not come here and ask for cavalry manœuvres, which are the only means by which cavalry can become efficient. With regard to reconnaissance and training for it, matters to which you, Sir, in your excellent report referred very strongly, the framework of every reconnoitring operation is drawing up the orders for it, orders based on a study of a map. Training in this is not of an arduous character, and can easily be carried out before the manœuvre period. With respect to training the non-commissioned officers, there has been a good deal of talk about the difficulty of doing this at many of the cavalry stations. I know Leeds, Manchester, and other similar quarters, and even there non-commissioned officers can be taught a great deal of their work—provided the squadron officers know how to teach it. But teaching is an art: few men are born teachers, and most of us have to learn how to teach; and I am not aware that when squadron and company training was introduced into our Service, any steps were taken to teach the officers how to do the work. I can assure you, however, that squadron officers will be amply repaid for the labour of teaching their non-commissioned officers. In my thirty years of teaching I have taught all kinds and conditions of officers and soldiers, and of all none are more eager to learn, work harder, are more intelligent, or take a greater interest in their work, than the British cavalry non-commissioned officers. You cannot have better pupils. But however expert an officer may be in drawing up orders for a reconnaissance, and however well-trained the non-commissioned officers, nothing except practice over a large tract of country will enable cavalry to become efficient in reconnoitring. It is the practical working of the screen and of the small bodies composing it, and the transmission of information and of orders within it, that constitute the real difficulties of reconnaissance. For reconnaissance, manœuvres of some kind or other are a necessity, and we do not always make the most of our opportunities, as the incident I will in conclusion narrate will show you. Some four or five years ago, hearing that a certain cavalry regiment was about to march from Aldershot to the North, and knowing the difficulties of finding opportunities for practising scouting and reconnaissance, I suggested to a friend at the Horse Guards that if the Regular troops and the Volunteers in towns and villages on the line of march were directed to turn out and oppose the advance of the regiment as it

came along, valuable practice would be obtained for the regiment. The reply to my suggestion was amusing:—"So-and-So (a high authority) desires me to tell you that he has read your suggestion, and thoroughly approves of it, but does not see his way to carrying it into effect, and he desires me to remind you that some years ago this regiment executed a similar march in England, and carried with it a travelling circus, which gave unlimited satisfaction in the places through which the regiment passed."

Sir FRANCIS GRENFELL: I had not the slightest intention of joining in this discussion, as I came to learn and not to speak; but the statement made by Colonel Lonsdale Hale that the infantry officers and the infantry generally take no interest in the cavalry, and do not believe in them, is one that I really could not listen to without repudiating. At the same time, though they do not believe in cavalry, and do not take an interest in them, Colonel Hale says: "You should see what a funk they are in when you get them on your flank." I think that shows that they do take a certain amount of interest in cavalry. But the real reason why the infantry officer is perhaps not sufficiently educated in the drill and movements of cavalry, is that, except at Aldershot, he has such very few opportunities of seeing it. I believe there are many places in England where small portions of both arms are stationed, but they are invariably manœuvred separately, and seldom drilled together. I think very often great advantage would ensue, and that the infantry officer would gradually learn more of the cavalry, if, in such cases, opportunity was taken to drill the two arms together. But anyhow, on the part of the Service in which I have been brought up, I must repudiate the idea that the infantry are in any way indifferent to the cavalry branch.

Colonel FRENCH: I wish to say one or two words in reply. Machine-guns have been referred to, and I think General Combe and Colonel Wallace take a different view to that which I put forward. I can add nothing to what Captain Anstruther Thomson has said. I absolutely agree with him, and I venture to hope that General Combe means, by what he said, that when machine-guns do get sufficient mobility, he thinks they may be used with cavalry. I can only say that my experience of him as a commanding officer assures me that if any improvement in point of efficiency in their handling is required, they will certainly attain to it under his supervision and guidance. With regard to Major Taylor's remarks, the words I used were quoted from a great German leader, General von Rosenberg, whose name is, I think, sufficient to give authority to anything he says; and, if I may humbly venture to say so, I absolutely agree with him. I wish to repudiate, as strongly as I possibly can, any intention of saying that the cavalry arm should ever fulfil a secondary or subordinate *rôle* at any stage of the cavalry fight. I cannot in the least see why, because we try to bring horse artillery into our manœuvres, and work them in conjunction with the cavalry in the manner we consider to be best, that therefore we, in any degree, abandon our *rôle* as the principal arm. Artillery assists the other arm, why not the cavalry? Why should we not work the cavalry so as to obtain from the guns as much assistance and co-operation as possible? and why, if we do so, are we to be told we are giving up what is called the principal *rôle?*

The CHAIRMAN (General Keith Fraser): Gentlemen, when I first suggested to Colonel French the great advantage it would be if he would give a lecture upon cavalry manœuvres, he proposed to describe the manœuvres of last year which took place at the camp of instruction; but I thought it would be more useful to officers in general if he would speak upon the subject of cavalry manœuvres generally, giving us his reasons for thinking they are of advantage, and stating what he knows of those that are carried out in Continental countries. We have all listened with great interest to the admirable lecture that he has given—a lecture which shows that he has very carefully studied the subject. The one

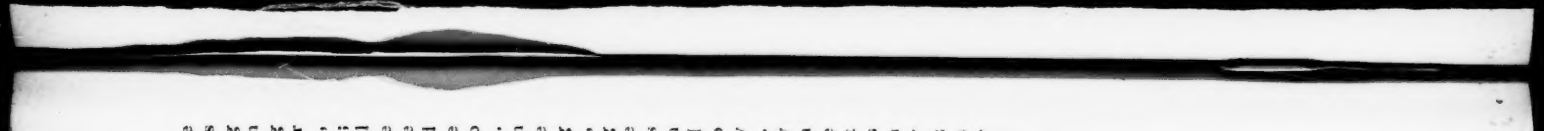
great object I had was that officers, not only of cavalry, but of other branches of the Service, should be able to be present and also to read the lecture afterwards in the JOURNAL of the Institution. This morning I received a letter from the Duke of Connaught at Aldershot, deeply regretting the absolute impossibility of his getting to London to-day, but expressing his delight to think that this lecture was to be given, as it would give opportunity for infantry officers, artillery officers, and officers of other branches to learn some matters about cavalry. As has been said well by a great authority, "How can we expect to fight the other arms if we do not know anything about their tactics?" I do believe myself that a great number of infantry and artillery officers do take the greatest interest in our cavalry, but I was very much disappointed last year at so few coming to the manœuvres. I do hope that at our cavalry manœuvres in the future infantry officers will be able to attend in larger numbers. I obtained leave last year to have horses provided so as to mount officers who came down under such circumstances, and it was of the greatest possible benefit to cavalry officers who could not go to the great expense of bringing down their horses. I hope for the future that infantry officers will also come in larger numbers. It is necessary that they should know more about the cavalry. We often hear opinions expressed as to our cavalry, not only in the Press, not only in the magazines, but also, I am sorry to say, amongst officers of the Army, who should know better, in which the cavalry is lightly spoken of. We can afford to laugh at such opinions; but it is a great mistake to give vent to them; it is bad taste, it is not soldier-like. I am sure the more the infantry see of the cavalry the more they will appreciate the difficulties we are under, and the better they will be able to judge of us. I think that cavalry manœuvres are useful to all the branches of the Service who go to them. Another great reason why the drawing together of the cavalry is a good thing is, that we learn how to use our cavalry in bodies, not only as the eyes and ears of an army, but in masses. This is a necessity which has been recognised abroad, and it was advocated by no one more than by the Duke of Wellington. Even in those days he realised the great necessity of massing cavalry, and he intended to make Corps of cavalry at the time of his invasion of France. He complained very much that regiments had never been in brigade, and that both infantry and cavalry got into disorder directly they were moved about, because very few of them had ever worked in combination with more than one other regiment. Now, how many of our regiments have the opportunity of working in brigade? They are scattered about and they do not have the opportunity of joining even one other regiment in brigade. It would be a great advantage if they could do so. Aldershot and the Curragh are admirable places for drill evolutions and instruction. They are neither of them large enough for great manœuvres, but we ought to be able to turn out from the Curragh and Aldershot excellent brigades of cavalry. As far as drill is concerned and evolutions, they are sufficiently large, but for manœuvres we want larger ground and more elbow room, for without elbow room we know the best tactician will be at his wit's end in a short time. We want elbow room both for our cavalry and our horse artillery. Horse artillery is the right arm of cavalry, and whatever may be said against it, we shall never get along in future wars unless we have rapidly-moving, quick-firing, and good-hitting artillery, well mounted, with good drivers and good horses. I hope, and feel sure, that our cavalry and horse artillery at Aldershot will be worked by General Combe more in future at Aldershot than has been the case of late years. Frederick the Great always made the first line the strongest; he said: "The first line must never be beaten back." Seydlitz advocated that also. There is one powerful argument, and that is, that what the enemy does you must do. In the French regulations the cuirassiers, the heavy cavalry, is in the first line in order to break down the enemy. It is a matter of great discussion, this question of the first line. Then there is a question with regard to

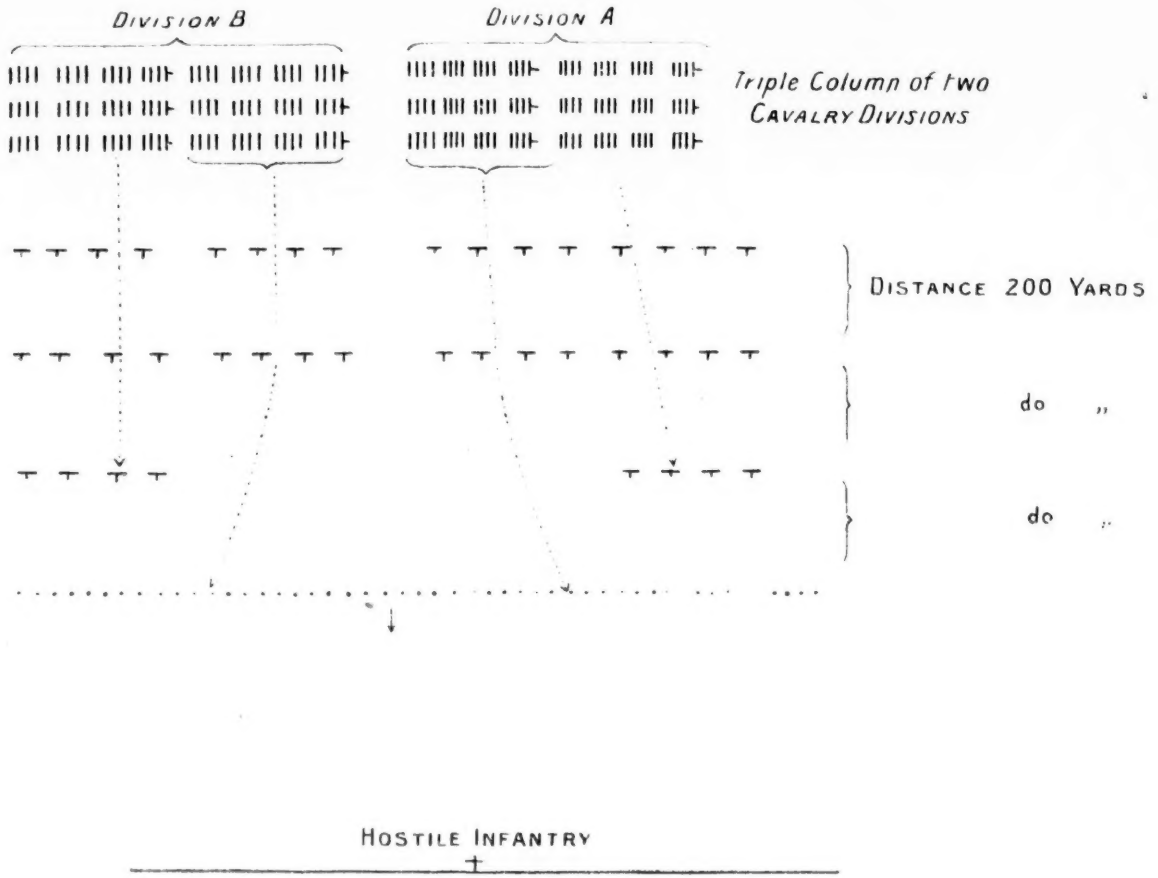
the horse artillery, whether it should act as a leading factor or not, *i.e.*, whether it should regulate the movements of cavalry or not. I think the leading factor of the thing is the enemy's cavalry. The cavalry commander generally has not much choice as to where the charge is to be. He has to take the initiative. I know that Colonel Lonsdale Hale, late of the R.E., thinks badly of the initiative. He calls it "high falutin" to talk about the "initiative," but every competent cavalry authority has laid down that, if you cannot take the initiative, you must, at all events, be the first to attack. The German regulations lay that down distinctly. Therefore, you have to get quickly to the front. If you have time to move your cavalry out on the flank, well and good; but this must depend on the enemy. It also depends partly on what is a good position for your guns, but it must be a very open country which can allow a division of cavalry to choose exactly where it will charge. The artillery must be subordinate entirely to the cavalry. Reference has been made to reconnoitring duties, and Colonel French has said, with great justice, he thinks rules ought to be laid down for the instruction of individual patrols and reconnoitrers. I am glad to say that in a few days (when I shall be no longer a cavalry soldier, I am sorry to say) some regulations will be in the hands of regiments. An Army Order will be issued giving a system of regimental instruction, which I have drawn up, to patrols, etc., which I hope will, at all events, lead to the better training of squadrons in reconnoitring duties in future. It is most necessary that we should begin with detailed instruction in teaching the men and non-commissioned officers. I was amused to find myself attacked in an article the other day in the *Times*, for not having used machine-guns at manœuvres. There were two machine-guns, which belonged to one regiment, for which I am not responsible. It was very proud of them, and I do not think it would have liked to have had the party of men belonging to one gun taken to shoot at the other gun. Another thing is this: At the cavalry manœuvres, I do not think the effect of infantry for machine-gun fire can well be calculated. One looker-on will say: "The whole of the cavalry is killed; they are all dead." Another will say: "They have not got the right range; they are missing everything." You have no bullets, and you cannot calculate effects. My idea about instruction in camp is to drill cavalry as cavalry. Nobody thinks better of machine-guns than I do myself. Their future will be great. With regard to making another unit in the battle-field, although I am inclined to what we have seen Captain Anstruther Thomson do so well, which is, to give machine-guns an independent *rôle*—but that is a matter to be decided in the future—I certainly would not put them with horse artillery, but I would keep them entirely apart, and let them act independently. With regard to future manœuvres, I do hope that they will go on annually. There will be a General Officer coming to take my place, who has had the advantage of being in a great position in India, as Inspector-General of Cavalry, and having annual cavalry manœuvres; and, I hope, in the five years, which I am glad he is to have, he will have many opportunities—I am sure he will—of doing immense good. I hoped we should have Salisbury Plain. I tried to make an arrangement two years ago, and I got numerous most satisfactory answers; but, unfortunately, one or two landowners objected; otherwise, that is the country, in my opinion, for manœuvres. We have some officers present who have served in foreign armies with great distinction, and, I think, they will tell you that at foreign manœuvres the General speaks his mind very freely to the officers—tells them what he thinks, points out the mistakes, and generally instructs them. That was my idea with the manœuvres last year. I thought manœuvres would be useless, unless you could point out mistakes and criticise and tell officers what you thought, rightly or wrongly; but, in doing that, it was not my intention to mean that our cavalry was inefficient—"pitiably inefficient"—I believe that is the word. I fear it may deter Generals from speaking their minds if these things are published

to the world as imputing blame. An officer in command of a brigade may be one of the finest fellows in the Service, but if he sits there with a man taking notes alongside of him, and he knows the next morning he will be put down as having grossly mismanaged the brigade, as having lost opportunities, or as having taken the initiative when he ought not to, in the opinion of people who know nothing whatever about cavalry—who only know the gossip of the hill—it must hamper him a great deal, not because he minds what is said, but because he thinks, "Some day there will be a war—some day a cavalry division will be sent abroad; will they give me a command, when I have been run down like that?" On actual service he would not care twopence, he would go ahead; but, at these manœuvres, he has to please this gentleman with the pencil, or otherwise he may not be employed on Service. I do not know whether our critics ever do read books, but there are many writers on cavalry, and if these critics knew what the cavalry leader has to do—what qualities he has to show, what difficulties he has to meet—they would think twice before they condemned him for some slight mistake. We have not been spared, we cavalry—I do not say myself, because I have been far too flatteringly spoken of—but it is a shame, indeed, to run down officers in the public newspapers, or to blame them, especially if you do not know anything about the matter yourself. There was an article in *Blackwood* a short time ago, in which the writer talked about "sham inspections," "one-day inspections, long anticipated." The *Times* correspondent used the same terms. I should like the men who write these things to ask some cavalry officer what an inspection is before they write them. Each branch of the Service should look after its own interests. We have much to learn. Do not for a moment think, from what I have said, that I do not think the cavalry have an enormous amount to learn; and the other branches also, from what I have seen, have very much to learn. We should "sweep in front of our own doors," all of us. Cavalry officers should go and see foreign manœuvres, and also read and study the works of the great masters of the art of cavalry. I hardly think enough is done in that way. I do not think the works of great writers—and the literature on the subject is very large—are sufficiently studied. There are books without end in France and Germany that are published, which are most useful; and as this is the last time probably that I shall address cavalry officers, I do ask them to read and study. Remember that the great Frederick himself said, "Study is the arsenal from which you would draw your weapons in the time of war; study to think and to act promptly," so as to be the model cavalry officer. I can only say with regard to the British cavalry, of which I have had the great honour of being Inspector-General for nearly four years, that so far from thinking it is in a "pitiable condition of efficiency," I think it is a most admirable cavalry. I judge our cavalry as it was judged by a great soldier, Bismarck, who just after the Napoleonic wars in 1817, said, "The British cavalry in its material excels all others that we know of, and in addition to its utility combines also beauty." That is my opinion of it now. May I now ask you to join with me in thanking the lecturer for his admirable paper, and for the opportunity he has given us to discuss this matter; and I also have to thank you for listening to me so long.

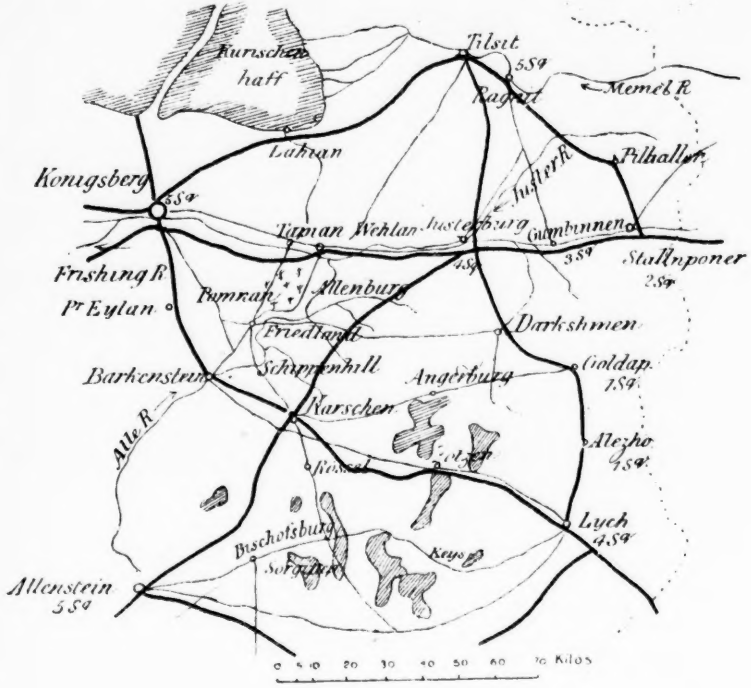
Sir FRANCIS GRENFELL: I will second the resolution which General Keith Fraser has proposed. I am sure we are all most deeply indebted to the lecturer for his very interesting lecture, and for the very interesting discussion that it has evoked.

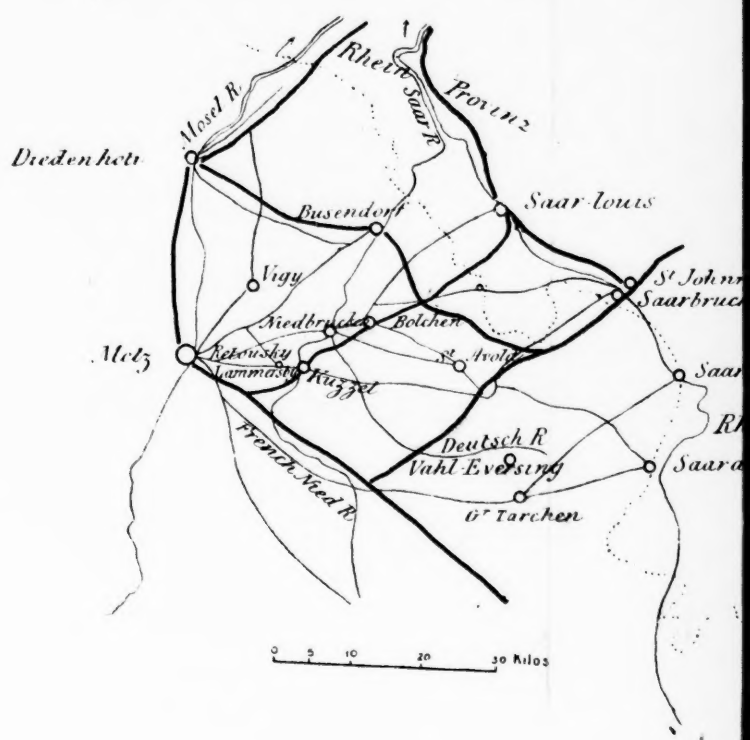
The resolution was carried by acclamation.





J. J. KELIHER & CO., LONDON.

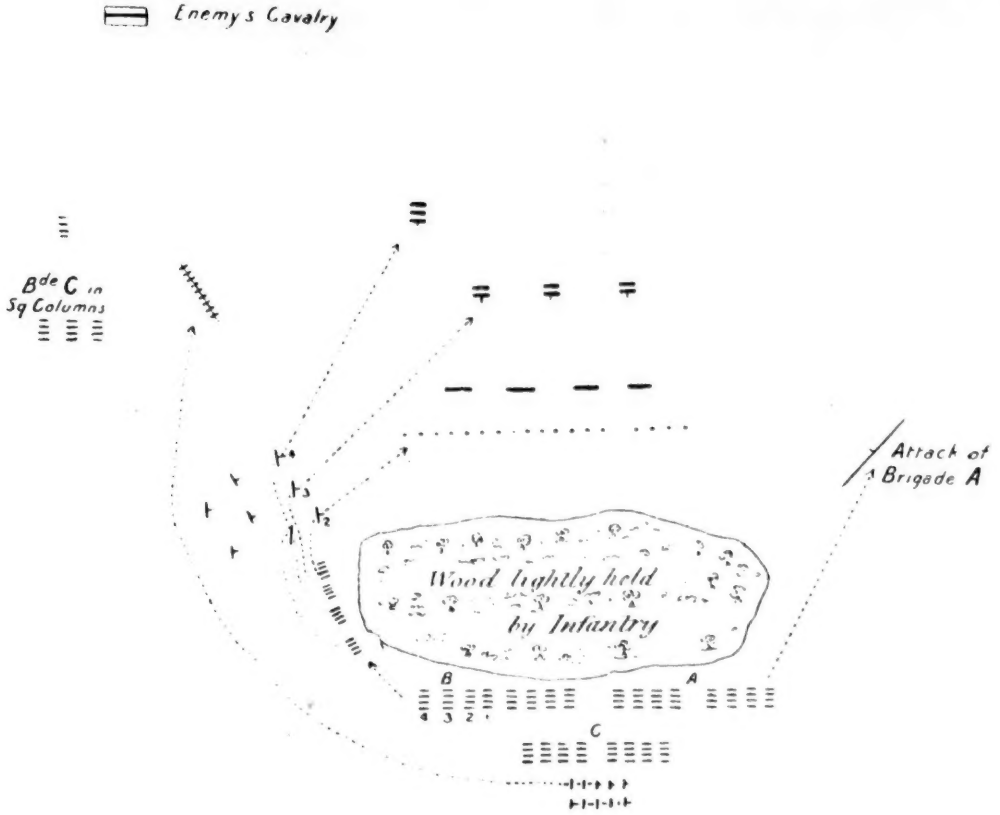




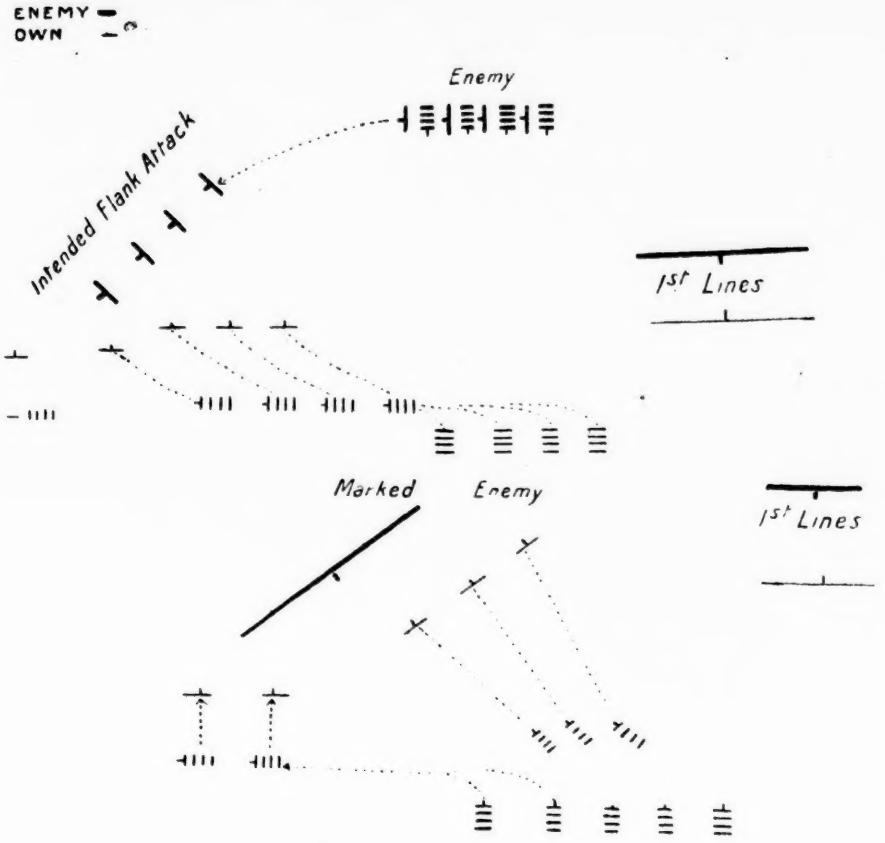
GARRISON TOWNS OF CAVALRY REGTS INDICATED

DIVISION B

DIVISION A


Enemy's Cavalry
Bde C in Sq Columns
Attack of Brigade A
Wood lightly held by Infantry
A
B
C

St Johann
Saarbrucken
Saargemund
Rhein Pfalz
Saaralben


ENEMY
OWN
Enemy
Intended Flank Attack
1st Lines
Marked
Enemy
1st Lines

Wednesday, April 10th, 1895.

Vice-Admiral PHILIP H. COLOMB, in the Chair.

THE ANTARCTIC EXPEDITION.

From a Naval point of view.

By CLEMENTS R. MARKHAM, Esq., C.B., F.R.S.

THE coming Antarctic Expedition, if it is to be made effective and successful, must be a naval expedition. The scale on which it must be planned, the character of the service, and the requirements of the work, make this a necessity of the case, a fact which will, I think, be clear to anyone who takes the trouble to study the subject in its various bearings. The present seems, therefore, to be a fitting time for considering the very important history of the work of the Navy in time of peace, so far as it appears to bear on the question of Antarctic exploration. That history takes us back to the dawn of our regular naval annals in peace and war, and recalls the traditions of many of the most famous achievements of the predecessors of our existing naval officers. Proud as this country has good reason to be of her long series of glorious naval victories, she has no less reason to look back with complacency on the work and the training which prepared the Navy for those victories, and on the achievements of the Navy in times of peace.

The main and principal work in the Navy during peace is the preparation for war. Anything that conduces to that end, either directly or indirectly, is legitimate work; and it is a satisfactory result that the pursuit of this great object has always been found compatible with the pursuance of labours which, while adding to the glory of the Navy, have conferred incalculable benefit on science, on commerce, and on humanity. Still, the preparation for the defence of our country and of our commerce must be the great object of naval operations in peace time. The training of officers and men is amply provided for, so far as technical knowledge is concerned, and at no time in our naval history has their efficiency, in this respect, reached so high a standard. There has also been a training squadron for the last twelve years, and there is the "Cruiser." But the operations of war are so complicated and many-sided, that no knowledge and no experience, so long as it is knowledge and experience connected with the sea, can come amiss. Work requiring special care and coolness of judgment; work needing an accurate judgment to be formed and acted upon on the instant; work presenting novel situations and suggesting new ideas—all these kinds of work strengthen and form an officer's character, widen his perceptions, and increase his self-reliance, based on the diversity of his experiences and

of his resources. He may not find exactly the same work in war service, but the work he has seen when employed on special service during peace time will have furnished him with many ideas and many experiences which cannot fail to increase his efficiency and value as an officer. It also stimulates the inventive faculty in cases where it is latent.

This, indeed, is the lesson that is taught by history. We have the record of grand pieces of work having been done by the British Navy, for which it has earned and received the gratitude of the whole civilised world; and we find that the training supplied by the execution of such work has turned out officers specially qualified for conducting or taking part in the operations of war. The work of surveying and of exploring must, therefore, be accepted as a useful training, and every measure which gives increased opportunities for supplying it ought to be welcomed as beneficial to the Naval Service. In the past our Navy has not only done by far the largest share of ocean surveying and exploring, but it has undertaken the most difficult and the most severe work, such as the survey of Magellan's Strait, and of the intricate channels leading to it on the western side; such, too, as the surveys of the Red Sea and of the Persian Gulf, done by the Indian Navy, which was a branch of our imperial Sea Service in peace and war.

The achievements connected with the Strait of Magellan represent work of which the Navy has special reason to be proud, because not only of the admirable results achieved and the extraordinary difficulties overcome, but also for the self-denying zeal shown by officers and men. This service is an excellent example of the value of such training to the Navy. The voyage of Sir John Narborough, two hundred and twenty years ago, was in itself a striking example of the good that such service secures for the profession. Sir John himself, having increased his efficiency by his experiences in the Strait, afterwards did valuable work in the Mediterranean, and trained a school of young officers, of which Sir Cloudisley Shovell was an example. Among his other followers in the "Sweepstakes" there were the future Arctic navigator, John Wood, and the indefatigable surveyor and cartographer, Grenville Collins.

But to come to the work in Magellan's Strait in more modern times, there are few pieces of service that are finer than those of Captains Philip King and Robert Fitz Roy. A harder and more intricate piece of surveying and of discovery—for it involved discovery—is not on record; nor must I omit to mention the unconquerable perseverance and pluck of Lieutenant Skyring. Not only were Magellan's Strait and the intricate channels of the Gulf of Trinidad explored and surveyed, but also the Falkland Islands, the outer coasts of Tierra del Fuego, and the whole Western coast of South America to Guayaquil, between 1828 and 1836. Fitz Roy's voyage of the "Beagle" produced a harvest of fresh knowledge, which, from the combination of geographical, physical, and natural history results, was unparalleled before his time. But it is not only his work, exceptionally valuable as it was, that should excite our admiration; it is Captain Fitz Roy's zeal for the Service and for the credit of the nation

that makes us feel proud of our countryman. When he found that vessels of less draught were necessary to complete the work thoroughly, he hired two small craft, and purchased a third entirely at his own expense. These gratuitous and noble sacrifices cost him several thousand pounds, not a farthing of which was ever re-imbursed. It is this unselfish spirit, called forth first by interest in the work, and then by zeal for the Service, which is fostered and bred by such employment, and it is this spirit which is sure to be invoked by special work in time of peace, arousing deep interest and enthusiasm. It is a spirit to be cherished in the Navy, imbuing our officers with the loftiest sense of honour and of fidelity, and helping to fit them to assist in the work of protecting and saving their country when the supreme moment arrives.

The work in Magellan's Strait is one example out of many. For, apart from our own islands and colonies, great part of the Mediterranean, all the coasts of Asia from Suez to Japan, nearly the whole of Africa, the west coast of South America, and the islands, have been surveyed by the Royal and Indian Navies; while the charts issued by our hydrographers are used and trusted by every nation in the world. This has, for the last century, been a splendid training ground; for such experiences, even during a short interval in the career of a naval officer, cannot fail to be most valuable to him.

But even more valuable, from this point of view, have been the expeditions of discovery. The production of more than one distinguished officer was the outcome of Lord Anson's voyage of circumnavigation. He himself displayed that temper, tact, and judgment which the circumstances called forth, and from which the Service reaped the benefit during his long and memorable term of service at the Admiralty. Among the men who received their best training under Anson's command of this exploring expedition we find the future Lord Keppell; we find Lord Hawke's most trusted officers, Sir Percy Brett, and John Campbell who was his flag-captain at the battle of Quiberon Bay; we find the well-known names of Saunders and Saumarez; and we find Hyde Parker (the elder), one of the most active captains during the seven years' war, who, in his turn, trained James Rennell, the greatest geographer that England has produced. Professor Laughton has well said that "in the whole history of our Navy there is not another instance of so many juniors rising to distinction in one ship" as on board the "Centurion" while on special exploring service under the command of George Anson. No less valuable was the training provided by Captain Cook during his three famous voyages.

Arctic expeditions have been another splendid and most fruitful training ground for our officers and men, ever since those famous Arctic explorers, Martin Frobisher, John Davis, and Edward Fenton, helped to fight and disperse the Spanish Armada. In 1773, again from 1819 to 1836, again from 1845 to 1858, and once more in 1875, our naval officers and men went forth into the Arctic regions to do hard and difficult work, calling forth all the highest faculties of their minds, giving them valuable experiences, and enabling them to raise the credit of their

profession and their country. They returned to the regular work of the Navy with minds enlarged and enriched by what they had seen and experienced, and consequently with increased efficiency and powers of usefulness. It is unnecessary to mention their names, for they are well known; but it should always be remembered that the list of naval Arctic explorers is headed by the name of Horatio Nelson.

Such voyages as that of the "Challenger" are also most useful to the Navy in time of peace. This country has undoubtedly led the way in all researches relating to the physical geography of the sea, and has kept the lead. Major Rennell, who was himself a midshipman for six years, by the preparation of his hydrographic memoirs, and his current charts, was the founder of the science of oceanography. It was zealously followed up by Captain Maury and more recent American investigators; but the most valuable and extended piece of work connected with deep-sea sounding and dredging was performed during the voyage of the "Challenger," under Captains Nares and Thomson. It was a survey of the ocean bottom of the greatest interest and the greatest importance; but that survey is incomplete until a survey of the Antarctic area has been added to it.

It is here, in the Antarctic area, that the next great scientific expedition has its work cut out, and the Navy will have the proud and glorious task of achieving those great results for the science of the world, for which scientific men are now anxiously and somewhat impatiently waiting. This is purely and exclusively naval ground. It is the largest unknown area on the world's surface, and none but English naval officers have ever penetrated more than a hundred miles beyond its bounding line on the Antarctic Circle.

Captain Cook was the first to cross the 70th parallel of south latitude, in 1774. His meridian was about 107° E., near the centre of the Pacific Ocean. It was in 71° 10′ S., at the end of January, 1774, that he came to the edge of the Antarctic pack ice, and he counted ninety-seven bergs, like a ridge of mountains rising one above another till they were lost in the clouds. Captain Cook considered that, although it might have been possible to get further south, it would have been a dangerous and rash enterprise; and, with the kind of ships he commanded, he was undoubtedly right.

The next vessel which crossed 70° S. was also commanded by a naval officer, although employed by a private firm. This was Captain Weddell, in 1823, who, in about 35° W., ran down to the latitude of 74° 15′ S., where he was not stopped by ice, but merely returned because there was a strong southerly wind blowing. John Biscoe, another naval officer, employed by Messrs. Enderby, was the discoverer of Enderby Land, on the Antarctic Circle in 50° E., and of Graham's Land, south of Cape Horn, which is now believed to be a promontory connected with the great southern continent. Biscoe crossed the Antarctic Circle to the south of the Cape of Good Hope, though he did not reach the 70th parallel.

But the expedition of Sir James Ross is the only one from which we can derive much practical information respecting Antarctic navigation, for

it is the only one which pushed through the south polar pack, and explored the region beyond, though only in one direction. This was purely a naval expedition, fitted out to make delicate and careful observations such as only naval officers have been found to be competent to have charge of, and to record with the accuracy which is essential for any useful scientific purpose. James Ross had had unequalled experience in the Arctic seas; he was a splendid seaman, a man of iron nerve, endowed with indomitable perseverance, and he was a most accurate and reliable observer. Under such a leader good work was sure to be done, and it was done.

We may now briefly glance at the Antarctic problem, and see what Sir James Ross did to solve it. He found the circumstances different in several material respects from what he had been accustomed to in the Arctic regions. In the north there is continental land all round the Arctic Circle, except where there are three openings; a great mass of islands, stretching in all directions to the threshold of the unknown region, forming numerous intricate channels, extends northward from the continents, and the currents and tides are complicated and often cause obstruction. In such a region large floes and fields of ice are formed, and the chief dangers are from collisions between the great ice floes and from long detention. But in the Antarctic regions the physical features are reversed. In the centre of the polar space there is a continent, probably ice-capped, whence the accumulated winter ice floats northward in all directions, accompanied by chains of enormous icebergs, flat-topped, with perpendicular sides, and often miles in length. The gales in the open sea prevent the formation of extensive fields or floes of ice, but instead there are masses of polar pack ice, consisting of huge pieces, and these masses of pack ice are sometimes several hundred miles in width. As these packs of ice float northward they leave a navigable sea behind them up to the southern continent. The problem, therefore, is how to evade and escape danger from the bergs and to get through the pack in order to explore the navigable water beyond it.

It is the glory of Sir James Ross that he alone has boldly pushed into this formidable south polar pack. Twice, in January and February, he did so successfully. A third time he made the attempt and failed, because it was too late in the season. For this service he was supplied with two old mortar vessels of great strength, the "Erebus" and "Terror." They withstood innumerable tremendous blows from the ice, and had several hair-breadth escapes; indeed, they would almost certainly have been lost had it not been for the iron nerve and consummate seamanship of their commanders.

On January 5th, 1841, Ross found the line of the main pack right ahead of him. He at once made the signal to his consort, bore away before the wind, and made straight for it, with a view to breaking through the outer edge, which is usually formed of much heavier ice than the rest. The bold manœuvre was successful without serious injury, although the old ships received some very heavy blows. The ice beyond the outer edge proved to be much lighter than when viewed from a distance. Ross's splendid audacity was rewarded. In six days he forced his way

into the open water to the southward, and on January 11th he discovered land, with a great range of mountains extending for 450 miles to the southward, which received the name of Victoria Land. On the 28th he came in sight of an active volcano 12,400 feet in height, emitting flame and smoke in great profusion. It was named Mount Erebus, and an extinct volcano by its side received the name of Mount Terror. There was a bay near the base of Mount Erebus, named M'Murdo Bay, after the First Lieutenant of the "Terror," where a landing might probably be effected, and where a ship might winter. At least, this was the opinion of Dr. McCormick.

The most astonishing discovery made by Ross was the lofty perpendicular cliffs, forming an ice barrier, extending from the neighbourhood of Mount Erebus for several hundreds of miles to the eastward. There was no appearance of rent or fissure. The cliff, stretching to the horizon, rose to a height of 200 feet, and the intensely bright sky beyond it indicated the great distance to which it reached to the southward. That it rested on land seemed certain, although its outer edge was probably not so resting. Indeed, this prodigious ice mass is doubtless one source of supply for the icebergs which encumber the Southern Ocean.

These were the great discoveries of Sir James Ross in the season of 1841.

In the following year the daring explorer took the pack on the 12th of January, and had a much more terrible experience. On the 19th the wind suddenly freshened to a violent gale, and the sea quickly rose to a fearful height. The ships were involved in an ocean of rolling fragments of ice, hard as floating rocks of granite, which were dashed against them by the waves with so much violence that the masts quivered as if they must fall at every successive blow. Their destruction seemed inevitable, from the tremendous shocks they received. By backing and filling the close-reefed sails they tried to avoid collisions with the larger masses, but this was not always possible, and thus the rudder of the "Erebus" was so much damaged as to be no longer of any use; while that of the "Terror" was completely destroyed, and nearly torn away from the stern-post. Ross says that, "throughout a period of twenty-eight hours, during any one of which there appeared to be very little hope that they would live to see another, the coolness, steady obedience, and untiring exertions of each individual were every way worthy of British seamen." The breadth of the belt of ice in which they weathered this gale of wind, and through which they forced their way into the open sea to the southward, was calculated to have been 800 miles. But Ross was not to be beaten. He forced his way through it, and explored the marvellous ice barrier, which is in 78° 10′ S., once more.

On the third occasion, in 1843, an attempt was made to force a way through the pack, near the meridian on which Weddell had reached 74° without seeing any ice. But it was in March, much too late in the season; young ice was forming, and the attempt had to be abandoned. But even then Ross pushed down south as far as 71° 30′. Thus three British naval

officers, Cook, Weddell, and Ross, are the only seamen who have ever crossed the 70th parallel, and Ross did so no less than three times.

It will have been seen that such a seaman as Ross could face and overcome the difficulties of the polar pack even in an old sailing vessel. But still more formidable in such a craft was navigation in thick weather, blowing hard to windward of a chain of Antarctic bergs. I know nothing more thrilling, in maritime story, than Sir James's narrative of the way he escaped, almost by a miracle, from such a predicament. It was on the evening of the 12th of March, 1842, blowing very hard, with blinding snow showers, and numerous small pieces of floating ice warned them of the presence of bergs. Suddenly a large berg was seen ahead; the ship was immediately hauled to the wind on the port-tack, hoping to weather it, when the "Terror" loomed out of the thick snow shower, running down upon the "Erebus" under topsails and foresail. It was impossible for her to clear both the "Erebus" and the berg, so a collision became inevitable. Sir James hove all aback to diminish the shock; still the concussion was tremendous, and the bowsprit and foretopmast were carried away. The ships hung together for a time, amidst the crashing of boats and upper works, while both were drifting down on the perpendicular cliffs of the berg on their lee. Providentially they gradually forged ahead of each other, and the "Terror" just cleared the end of the berg. But the "Erebus" was left completely disabled. She could not wear, for by this time she was so close to the berg that the waves, when they struck against it, threw back their spray on to the deck. The only way to extricate the ship from this appalling situation was by resorting to the hazardous expedient of making a stern board. She was rolling heavily, and the lower yard-arms were actually grinding against the ice cliffs, which towered high above the mast heads. This rendered it a service of extreme danger to loose the mainsail; but no sooner was the order given than the daring spirit of the British seaman manifested itself. The men ran up the rigging, and, although more than once driven off the yard, they eventually succeeded in loosing the sail. The yards were braced bye, and the main-tack hauled on board with the sail flat aback. The ship then gathered stern way, washing away the gig and quarter-boats, and, with her lower yard-arms scraping along the rugged face of the berg, she reached its western termination. The under bow alone prevented her from drifting to atoms against the berg. But no sooner were they clear than another berg was seen directly astern, against which they were running. It was, in fact, a chain of bergs. The difficulty then was to get the ship's head round and pointed fairly between the two bergs, the width of the intervening space being about three times the ship's beam. This, however, was accomplished, and in a few minutes after getting before the wind she dashed through the narrow channel, between the two perpendicular walls of ice and was safe.

Nothing can give a better idea of one of the dangers of Antarctic navigation than this admirable picture drawn by a master hand. Sir James Ross faced and overcame the perils from icebergs, and the still greater difficulties from the pack, and after three seasons in the ice, from

1839 to 1843, he brought the two old ships safely home, laden with a rich harvest of valuable scientific results. This was a service of which our Navy may well be proud. It was a glorious peace victory. It is now more than fifty years since this great achievement was done, and nothing more has been attempted in the south polar regions during all that long time. But now there is a pressing call for renewed Antarctic exploration, and the work cannot be done well—some of it cannot be done at all—except by the Navy; so that another noble opportunity of emulating the deeds of Ross and Crozier is presenting itself.

It must be the work of naval officers, because the most important part of it, such as the magnetic observations, can only be entrusted to those who have received a thorough scientific training; nor could the deep-sea sounding be entrusted to inexperienced people with inadequate apparatus. For such difficult service, too, naval discipline seems absolutely necessary, for, as Dr. Murray has well put it, "the work of such an expedition involves long and faithful attention, drudgery, devotion to duty, year in and year out, which can only be looked for, with certainty of success, in the discipline of the Navy, where there is zeal for the honour of the service."

We now come to the results that are required from a new Antarctic expedition. The most urgently needed are, without doubt, connected with the requirements of magnetism; and they are thus set forth in the Report of the Committee of the Royal Society. The positions of the south magnetic pole and of the southern force of maximum intensity are still uncertain. The question as to whether the magnetic poles are at rest or revolve is of the greatest importance. Further than this, while we know that south of 40° S. changes have taken place in the magnetic elements since Ross's Antarctic survey, there are no means of ascertaining the extent of those changes without another expedition.

The practical importance of a more complete knowledge of terrestrial magnetism is forcing itself upon the attention of navigators. Wooden ships, which contributed largely to our knowledge of magnetic variation, have disappeared. They are replaced by rapid iron ships, to which a correct knowledge of variation means saving of distance, and such knowledge is a necessity in latitudes where the sun is often obscured. The iron ships cannot themselves contribute to the variation charts, because it is not possible to make correct magnetic observations on board them. Hence increasing difficulty is experienced in constructing a variation chart to meet the requirements of iron steamships navigating between New Zealand and Cape Horn, a region where the sun is often obscured, and no observations possible. The same, in a lesser degree, may be said of vessels navigating between the Cape of Good Hope and Australia.

At all the southern extremities of the great continental areas, the Cape of Good Hope, Cape Horn, Australia, and New Zealand, the secular change of magnetic declination is small. In the intermediate ocean areas and to the south it is large, but the amount is unknown. It is only by organised observations that it can be ascertained, and that the great

changes that are known to be taking place can be calculated for the different parts of the Southern Ocean. In short, the interests of science and the practical navigation of iron or steel ships point to the increasing necessity for further information as to the facts of terrestrial magnetism; and it is only by an Antarctic expedition that the missing data can be obtained.

In the near future magnetic disturbances are expected to be at a minimum, and this is the most appropriate time for making magnetic observations in high latitudes, where such disturbances are more severely felt than in the temperate zones.

This branch of the Antarctic expedition's work is of the highest scientific value; it is also of great practical importance, and it would be done more satisfactorily now, or in the near future, than if there is delay. But magnetic observations, though perhaps the most important result, are very far from being the only result of Antarctic research. Oceanography requires many observations in the Antarctic regions. The temperature at different depths, the specific gravity, the movement of the water, both on and below the surface, all bear directly on the study of the ocean in more temperate climates. Meteorology will also derive great benefit from observations within the Antarctic Circle. For the effect which the meterological condition of the south polar region, unimpeded by land, may have on the changes of climate over large areas north of it, is unknown, though it must be great. The cause of the abnormal lowness of the barometer in southern seas is not understood; and this, too, is an investigation of special interest. Dredging is another part of the work, and a knowledge of the biology of the depths of the Antarctic Ocean, which is ultimately connected with the past history of the globe, is all but wholly wanting. Such knowledge will be a great service to biological science.

Equally valuable results are to be derived from the discovery and exploration, so far as is possible, of the Antarctic Continent. Here geological observations may be made, the thickness and structure of the ice sheets may be examined, and the coast lines may be delineated. To all this must be added the certainty, established by all former experience, that numerous unforeseen and unexpected results of scientific value will be derived from the exploration of an unknown region of vast extent.

The leaders of an expedition will decide upon the means of overcoming the obstacles presented to Antarctic navigation, and of securing the important scientific and practical results that are required. They will find that steam-power has revolutionised the conditions as they were presented to Sir James. Admiral Sir R. Vesey Hamilton, after careful investigation, has come to the conclusion that steam-power has only added 25 per cent. to the facilities of Arctic navigation, but that it has increased the power of exploring the Antarctic Ocean more than 100 per cent. Calms occur sometimes, and there are often adverse winds when there is clear weather. At such times a sailing vessel would be beating up twenty miles, while a steamer might make 100 miles. A steamer would pass through the polar pack in a tenth of the time that a

sailing vessel could work through it; while in a navigable sea a steamer would easily do all the work in one season which occupied Ross three seasons, and a great deal more. A steamer will be in little danger from large icebergs, except during fogs, and in heavy gales she could lie in safety under their lee, instead of drifting at the mercy of wind and waves. This was actually done by Sir George Nares in the "Challenger."

During a gale of wind in the pack a screw steamer would be in some danger, and would require very skilful handling. She would avoid collisions with heavy pieces of ice better than a sailing vessel, but she might not be able to do so altogether, so that her rudder-post and screw-propeller might be seriously injured. Much attention will therefore have to be devoted to the fitting, and especially to the strengthening, of the after-part of the screw steamers that may be selected for Antarctic service. There should certainly be two vessels; they should be as well strengthened to receive blows from the ice as were the "Erebus" and "Terror"; they should have steam-power, and they should be specially strengthened or protected aft. They would, of course, be fitted with all modern appliances for deep-sea sounding and dredging. A full commission of three years would be necessary for the performance of the work, and an effort should be made to find a safe place near the shore of the Antarctic Continent where one of the vessels could winter. It is desirable that the pack should be approached at least a month earlier than was the case in Ross's expedition, in order that there may be more time for exploration during the navigable season, and this can easily be done with steam-power. Screw steamers will also be better able than sailing vessels to double the pack.

As regards the question of expense, this will in no way affect the Navy Estimates. The Antarctic expedition will be a separate vote. It is scarcely necessary to discuss the question, because as soon as public opinion has made itself known, and an expedition has been decided upon, there is never any difficulty on that score. It may, however, be worth while to allude to the very misleading way in which the Arctic estimates and the "Challenger" estimates are shown. The real cost to the country is always enormously exaggerated. For instance, the whole double pay is invariably charged, whereas officers and men would be receiving single pay under any circumstances; consequently only single pay ought to be charged to the expedition. Then, as regards the ships, supposing the building and equipping of two suitable vessels cost £90,000—probably an excessive estimate—the whole would be charged to the expedition.

But this would be a most erroneous view of the case. The ships are ready for use elsewhere when the expedition comes to an end. Take the cases of the "Alert" and "Discovery." The Arctic expedition had the use of them only for eighteen months. But the "Alert" has been in constant use, doing valuable service in Magellan's Strait, in Hudson's Bay, and elsewhere during the following twenty years. The "Discovery" has been incessantly used for dockyard work during the same period, and is still in use. Consequently the expedition ought only to be charged with about a twentieth of the £90,000, or £4,500 divided over three years

in the case of an Antarctic expedition; or £1,500 a year for the ships. The same applies to scientific apparatus of all kinds. It is misleading to charge the whole cost to the expedition; the estimate should only be for the wear and tear during three years. When the estimate is fairly and honestly prepared, it will be found that the real cost is about £20,000 a year—a mere trifle compared with the great value of the scientific results. and with the other benefits to the Navy and to the nation that will be derived from the Antarctic expedition. But this is a question of account, which can be treated in various ways.

Foremost among those benefits is the excellent effect that all such undertakings, in which our country has ever been prominent, have always had on the Navy, by opening up interesting employment in a new field, and by maintaining that spirit of enterprise which is the life blood of the profession. Personally, I value this more than all the scientific results put together, valuable and important as they are. It was to secure this end that my dear friend Sherard Osborn so persistently advocated a renewal of Arctic exploration until he secured the desired end just twenty years ago. On the last occasion that our Government was approached by an influential scientific deputation, the reply was worthy of a Prime Minister of England, it was that, "having carefully weighed the reasons set forth in support of an expedition, the scientific advantages to be derived from it, its chances of success, as well as the importance of encouraging that spirit of enterprise which has ever distinguished the English people, Her Majesty's Government has determined to lose no time in organising a suitable expedition for the purposes in view." These noble words represent the best and wisest policy of England when her destinies are guided by men worthy of her traditions. That policy has never been reversed. It will be an evil day for our country if it ever is reversed; and that day, we trust, is far distant. So that we have no reason to anticipate anything but a favourable answer from Her Majesty's Government as soon as public opinion is formed and made known, and the proper time has arrived for representing the necessity for renewing work that has been so lamentably neglected during the last fifty years and more.

An Antarctic expedition is, then, a training squadron of great value to the Navy; a training squadron with double pay and promotion, and openings for gaining credit and distinction. It will supply training in all those qualities which are most valuable in time of war, while encouraging a spirit of enterprise and stimulating zeal for the credit of the Navy and of the country. As Anson's circumnavigators became the foremost naval commanders during the seven years' war, so we may expect our future Antarctic navigators to return to the regular service, invigorated by new experiences and fresh energy, and more ready than ever for anything that may befall.

Admiral Sir Richard Vesey HAMILTON, K.C.B.: Before entering upon the discussion of this paper, in which my name has been mentioned by the lecturer, I think I will lead off the ball by saying that I have only one complaint to make of the paper, and that is—that the lecturer, who was allowed an hour to read his paper, has occupied only three-quarters of an hour. He has defrauded us of a quarter of an hour of pleasure, but we will forgive him that. A very eminent clergyman once said that he would like his congregation to hunger for more. I think in this case we are hungering and thirsting for more, and I hope it will create an interest in this important subject and induce you to use your influence, and the influence which even the ladies may bring to bear on those who have the dealing with and fitting-out of an expedition of this sort. I will make a few comments upon the paper. There is no doubt about it that every one here will agree that "the coming Antarctic expedition, if it is to be made effective and successful, must be a naval expedition." That cannot be too strongly enforced. I cannot do better than refer the words of Dr. Murray to those who have not had the advantage of reading this paper. Dr. Murray was one of the eminent *savants* of the "Challenger," and therefore knows what he is talking about. He put it very well in the paper he read at the Geographical Society some time ago, where he said, "The work of such an expedition involves long and faithful attention, drudgery, devotion to duty, year in and year out, which can only be looked for with certainty of success in the discipline of the Navy, where there is zeal for the honour of the Service." I think he might very well have added to that "very great zeal for the interest of science," because the interest of science is the interest of commerce, and without commerce there would be no Navy. I was about to allude to the valuable magnetic observations in order to induce Captain Creak to enlighten us on the subject; but he has done so in the excellent paper read by the secretary, so that he has anticipated me. The lecturer has laid great stress on Captain FitzRoy's Polar Works, and more especially that his "gratuitous and noble sacrifices cost him several thousand pounds, not a farthing of which was ever reimbursed. It is this unselfish spirit, called, fostered, and bred by such employment, and it is this spirit which is sure to be invoked by special work in time of peace, arousing deep interest and enthusiasm. It is a work to be cherished in the Navy, imbuing our officers with the loftiest sense of honour and of fidelity." Gentlemen, I will make one comment in that case, and that is the contemptible meanness of the Government of the day in not refunding to this officer so much money spent for the public service. The Treasury was bad enough in those days, and it is no better in the present day. Professor Laughton has certainly produced a very strong argument in favour of these expeditions, when quite a number of Lord Anson's men came to the front—"it is here in the Antarctic area that the next great scientific expedition has its work cut out." On that point I recommend those who have not read it to read the very excellent summary of the voyage of the "Challenger," by Dr. Mills, in, I think, one of the latest geographical journals. He there gives an account of the temperature of the water at various depths, which is most interesting to us as seamen. The lecturer has dwelt upon the iron nerve and splendid seamanship of Sir James Ross. His followers did not allow him any nerve—they called him "nerveless"—and it is a man of that sort that you want for a future Antarctic expedition. The lecturer also dwelt upon the damage done to the ships, to the stern posts and screw propellers in the ice. On that point there is no doubt. A modern screw ship is weaker than an old sailing ship, because she has a double stern post. I put it forward as a matter of consideration whether the turbine principle should not be adopted. It has many drawbacks, but at the same time we have used it in two national lifeboats with great success, and being in the middle of the ship, I think we would be able to fence it in, and the probability is that it would be a very much better means of moving in that region than the screw. With regard to the lecturer's remarks on magnetic variation, there is no doubt

about it that it is only by an Antarctic expedition that the missing data can be supplied, and that is almost indispensable in the interests of commerce at the present day. When the last magnetic observations were made fifty or sixty years ago, our ships steamed 7, 8, or 9 knots. If we went 10 knots we thought the ship was running away with us. Now 10 knots is "half-speed." When we get 20, 25, or 30 knots an hour, it is of the highest necessity in the interests, not only of commerce, but of human life, that every single thing should be done to facilitate the navigation of the ocean. The lecturer has quoted a remark of mine which I made thirty years ago, to the effect that steam power, while adding 25 per cent. to the facilities of Arctic navigation, has increased the power of exploring the Antarctic ocean more than 100 per cent. Upon that I should like to say this: My remarks made in those days applied to steamers of 5 or 6 knots speed. In the present day we shall probably have steamers of 7 or 8 knots there; consequently, my remarks were considerably under-estimated in those days from what they would be at present, and I think that is a very important point. The work done in the whole of the united expeditions of that time—the British expedition under Ross, the American expedition under Wilkes, and the French expedition under Dumont d'Urville—might be done at the present day in one year by more powerful steamers and with greater safety. The only regret I have is that the lecturer has not been able to get that most stirring picture of the episode that he has already alluded to with regard to the collision with the iceberg, and which gives you a far greater realisation of the danger in an Antarctic expedition than any of the pictures on the wall. The lecturer has dwelt upon the misleading way in which the Arctic estimates have been shown, and has stated that the real cost to the country has been enormously exaggerated, and that the cost of the ships charged to the expedition votes ought to have been charged to the Navy votes. He has also stated that "as Anson's circumnavigators became the foremost naval commanders during the seven years' war, so we may expect our future Antarctic navigators to return to the regular service, invigorated by new experiences and fresh energy, and more ready than ever for anything that may befall." In the past Arctic expedition we have a very signal instance of that in the part taken by the late Admiral Sherard Osborn, who was one of the most distinguished officers in the Sea of Azov and also during war operations in the Black Sea, and who was selected to have been—if the war had continued—the leader of an expedition up the rivers Mingrelia and Imerita, which no doubt would have been of very great interest to this country. I am only sorry that there is not what I may call a subject of controversy in this paper. Controversy, like flint and steel, strikes out all the information that can be acquired. I like to find out what various people have to say on these points, and I can only say for myself I agree entirely with every word that has fallen from the lecturer.

Admiral A. H. MARKHAM: As no one else appears to be getting up to discuss this paper, I will just say a few words. I am sure I am only expressing the thoughts and feelings of everybody here this afternoon when I say that we have listened with a very great deal of pleasure to Mr. Markham's most interesting paper. To me, having always taken a very keen and very great interest in all matters appertaining to the exploration of the high latitudes, whether in the Arctic or Antarctic regions, it has been especially interesting. Mr. Markham has alluded to the various scientific results that he says are likely to be derived from the despatch of an Antarctic expedition. These results, I am quite sure, are not only likely to be derived, but they are sure to be more than fully realised, for when we come to consider the admirable work that was done by Sir James Ross more than fifty years ago, and remember, as the lecturer has told us, that that excellent work was carried out in a couple of old sailing tubs dependent on the action of wind on their sails for their motive power, we shall see that steam has made a great revolution in all matters connected with ice navigation. I am

quite in accord with the lecturer, and also with Sir Vesey Hamilton, in believing that a couple of well-found steamers, perhaps one of them fitted on the principle that he has alluded to, viz., the turbine principle, will do as much in a summer's cruise as Sir James Ross did during the whole four years of his absence; and, I take it, if proper precautions are taken, and the necessary precautions, it will be done with absolute certainty and safety. The point, ladies and gentlemen, that Mr. Markham has made in his paper, and which has been so ably supported by Sir Vesey Hamilton, is the one that I particularly wish to emphasise, and that is, that an Antarctic expedition, if it is despatched from this country, should be despatched under naval auspices. Private enterprise, as we all know, has done a great deal, and is still doing a great deal in good and useful geographical work in various parts of the world; but in order to ensure success to an expedition that is sent out, either for the exploration of the Arctic or Antarctic regions, it is in my opinion absolutely necessary that the members of that expedition should be amenable to naval discipline, and that it should be under the direct control of the Admiralty. Speaking as a naval officer, and as one who has had various experience in all parts of the world, I unhesitatingly say that I know of no school better adapted to develop those essential qualities to which every naval officer could aspire—I mean, watchfulness, accuracy of judgment, readiness of resource, prudence, combined, of course, with that necessary element of audacity and dash, and perhaps a little more of the latter than of the prudent part—than will be found in handling your ship whilst navigating among these massive icebergs of the Arctic and Antarctic regions, to say nothing of those subsequent operations that always follow after a ship has been secured in winter quarters, I mean travelling on sledges along the coast line, where hardships and privations of no mean order have to be faced and battled with. It may, perhaps, be somewhat strange, but nevertheless true, that we owe a good deal of our knowledge of the Arctic regions to the last Antarctic expedition, for I cannot help thinking that had it not been for the return of Sir James Ross, and the fact that the two ships, the "Erebus" and "Terror," were lying idle, and therefore at the service of the Government, in all probability Sir John Franklin at that time would not have been sent in quest of the North-West Passage; and we also got a great deal of our geographical information of the Arctic regions from those several search expeditions that were sent out year after year to look for the missing ships. The lecturer's reference to the erroneous statements with regard to the expense of scientific expeditions, has put the matter before me in quite a new light. I never for one moment considered it before, and I do think it is a very misleading fact to charge the last Arctic expedition with the value of those two ships, which the lecturer has told us, and which I will corroborate, have been doing very good and useful service for the last twenty years. I will say no more, except that we are deeply indebted to Mr. Markham for having thus come forward to ventilate this question of Antarctic research in this theatre, and I sincerely trust that his efforts to secure the despatch of an Antarctic expedition—let us hope it will be a naval one—will be crowned with success.

Lieutenant MARTIN LEAKE: If a lieutenant may be allowed to speak in this theatre, I feel sure I am expressing the feeling of my brother officers of my own standing, in stating that we hail an Antarctic expedition as a means of learning much that will be useful to us and of gaining distinction, and I feel sure that enough volunteers will be found among the lieutenants to man the entire Antarctic expedition.

Admiral FITZGERALD: Sir Vesey Hamilton has asked for a little controversy. He seemed to think that the Arctic people were having it too much their own way. I have not read the paper, and I could not hear what Mr. Clements Markham said, but I suppose that is no disqualification for criticising it. I imagine I am not wrong in gathering that another Antarctic expedition is proposed. Well, the foxes that had no tails had very little difficulty in proving that tails were a useless and

ridiculous appanage; and I have no doubt that, from one point of view, another Antarctic expedition might be so considered. If it is intended to be undertaken and money spent on it for the purpose of finding out what magnetism is, I do not believe it would be a success. I do not believe you will ever find out what magnetism is, and I think you will be able to navigate just as well without. You know what it does. That is quite enough for you. You cannot find out what it is. But if you put it on what I might call higher grounds, as an opportunity for exercising those qualities which Admiral Markham so eloquently expressed—enterprise, dash, resource, courage, and, in fact, fighting the forces of nature; for what I might call shamming war, when we cannot have real war, to call forth those qualities, I should say that it would be entirely worthy of the support of any Government. On these grounds, and if it is for the encouragement of that insatiable desire which our country has of planting the British flag upon every barren rock in the ocean and every desert sand in Africa, or every mound of snow or ice in the Arctic or Antarctic regions, then I can thoroughly sympathise with you. I believe that desire would carry you to the moon if there were only a way. I am sure it would if you were not forestalled by our friends the Americans, for I believe that immortal bird of freedom would soar there before you and plant the Stars and Stripes before you could get there. But if it were not for that, I feel sure we should be the first. Under these circumstances I believe that the Antarctic barrier is not an unworthy object for the chivalry of the British Navy to break their lances against, and if another expedition is undertaken I shall heartily wish them every success.

Professor J. K. LAUGHTON: I do not think I can add anything to what Sir Vesey Hamilton and Admiral Markham have so well said. Research in the Antarctic regions undoubtedly offers very great advantages in the way of supplying desiderata in connection with many sciences, not only magnetism, which Admiral FitzGerald seems to scorn, but meteorology. I wish the President of the Royal Meteorological Society had been able to remain, for he might have been able to speak more at length on the advantages to be gained to that science by such an expedition; and then, of course, there is geography, to say nothing of the rational curiosity of human beings to know what is to be found in the dark corners of the earth. I hope that this expedition may go forward. I hope I may live to see it return with glory, having planted the British flag on the South Pole itself.

The CHAIRMAN: As Captain Tizard has been in the Antarctic regions himself, we should be very glad to hear him.

Staff-Captain T. H. TIZARD, R.N., F.R.S.: I had no intention of saying anything, being entirely of opinion that an Antarctic expedition would be a very good thing; but I do not think it is any use preaching to people who have not any authority, and calling upon them to send such an expedition, although they may have every will to do so. It is something like a parson holding forth to his congregation, saying how bad it is for the people to stop away; this is useless, because he does not get at the people who are stopping away to tell them that they ought to be there. I only wish the financial authorities of the Government were here to have heard the proofs brought forward that such an expedition would cost very little, and that it ought to be carried out by the Government. We, however, have no power to send such an expedition. It is only the financial people of the Government who have the power to do it. We have only the will, which is, of course, an argument in favour of such an expedition, as the work must be done by the Navy to be done successfully.

The CHAIRMAN: As it appears that the discussion so far as the audience is concerned is closed, it becomes my pleasing duty to ask you to render your warmest thanks to the lecturer for his eloquent and most instructive paper. My own view of Antarctic discovery is, that it is one of those things that is bound to come. You cannot escape from it. It will be done at some time or another, and the only question is, When? And it is by the promulgation of such ideas as are

announced here in the theatre of this Institution that public opinion on that matter will be ultimately formed. It seems to me impossible that, while we are exploring every part of the world so far as the land is concerned, we should in any degree drop exploration as far as the sea goes. It is by exploration at sea, as the lecturer has shown us, that we have made ourselves what we are, and I think we are quite sure to go on with it. I think we are all agreed, even that contemptible creature, an "edge-of-the-icer," and especially those of us who have seen something of what Arctic scenery and Arctic work is, with the lecturer in thinking that it is in any case a splendid training for the naval officer. It may be perfectly true that the numbers who would go on such an expedition would be few, but you may be quite sure that every one of them will come back a better naval officer than he went, and that he would spread the spirit and the knowledge and the way of looking at things which he has gained in his Southern expedition amongst his fellows in the regular service who have not had that privilege. A great deal of stress has been laid upon the scientific part, and Admiral FitzGerald, as usual, has struck oil in the way of wit, where others would fail altogether; but for myself I think that that question of magnetism is, after all, more practical than scientific. We are distinctly told that, by our scientific discoveries and arrangements, we have reduced, within a comparatively small number of years, the wrecks of all kinds by about one-half. Most wrecks take place by running on shore, and a very large proportion of these runnings on shore have occurred from defects of one kind or another in the compasses; and the perfection of the compass is a matter, therefore, which closely affects our safety at sea, our commerce, and the prices of everything we consume which comes to us over sea. There is another point with regard to Arctic exploration which the lecturer has dwelt upon—that is, the commercial aspect. For myself I cannot help thinking, having looked somewhat into the question, that the "right" whale must be in abundance in the Antarctic regions, if the locality could be only found. It is quite certain that parcels of whalebone come to us from New Zealand, the product of the "right" whale; and though these parcels are small and few and far between, the price of them at home is enormous. I suppose all ladies know what the price of whalebone means, and all ladies, therefore, should be on the look-out for the development of more whale fisheries if they are in any way to be got. Sir Vesey Hamilton spoke on the question of steam, and his remarks were referred to by the lecturer as to the great advantages that steam gave in combatting with the ice in the Northern and Southern regions. I had myself some experience of that kind. I made a voyage to the Arctic regions in a steamer which was comparatively powerful for that kind of work, the most powerful steamer that has ever navigated in those waters; and unquestionably the way in which we were able to push through the ice, when neither a sailing vessel nor a small, low-power steamer could have done it, was most surprising. It did not seem as if any thickness of pack would have absolutely stopped the ship. We could have worked through in some way or another. With regard to the question of collisions with icebergs, we had some, and I quite recollect on one occasion scraping our yards against the sides of one. It was one of those days of misfortune, when we weighed on Friday, and we all thought we came to grief for that reason! But it was not so serious a matter for a steamer to do that as it was for a sailing vessel, and we came clear of our iceberg without material damage. Sir Vesey Hamilton mentioned how many, and the lecturer, in the early part of his paper, dwelt greatly and rightly on the number of distinguished men who had, early in their career, acted as discoverers in these matters. He was modest, naturally about himself. We all know what he was in active service, and I hope he will allow us to put down some of it to his Arctic training. That the expedition must be naval, I think there can be no question. I do not suppose that a private expedition could face the Antarctic regions, although some of them have faced the Arctic regions, where things are better known; but you do require the discipline and the strength

of naval cohesion to carry a ship through the difficulties and the dangers which are inevitable in such navigation. I was very glad—and we are always very glad in this theatre—when the younger naval officers address us. It is one of the things we are always looking for, more and more, and I am practically sure that he only represents the feeling of the whole Navy amongst the younger officers when he says that there would be volunteers forthcoming to man the ships in question entirely from the list of lieutenants. I hold my opinion as to the desirability and the ultimate certainty of our Antarctic exploration, because I am in no way connected with it, and I am perfectly sure that if I were a Lord of the Admiralty I should doubt about it, and if I were connected in any way with the Treasury I should laugh it to scorn! But there are powers behind the Treasury stronger than the Treasury, and a little thing sometimes puts those powers in action. Let us hope that the eloquent address we have listened to to-day may apply some of that force and make a certain amount of stir in the country, which will ultimately lead to the action even of the Treasury. I am quite sure you will join me heartily in thanking the lecturer for the trouble he has taken in preparing the lecture, but before I finally give him your vote I have to ask him to make his reply himself.

Mr. CLEMENTS R. MARKHAM: The mention by Sir Vesey Hamilton of the use of turbines for Antarctic ships reminds me that poor Captain FitzJames, who went out as commander of the "Erebus" in Sir J. Franklin's expedition, in a letter he wrote on the subject to our old friend, John Barrow, suggested the use of the turbine or some principle of the same kind in the Arctic regions, instead of the very small engines that were put on board the "Erebus" and "Terror." Only last night I was reading his letter on the subject, and looking at a little pen-and-ink sketch which he made. The hope in the existence of "right" whales in the Antarctic regions is not only derived from the small amount of bone—I believe it is a very small amount of bone—that comes from New Zealand, for Sir James Ross certainly does mention having frequently seen "right" whales, and Captain Larsen told me this summer that he was actually fast to one, and if anyone knows what "right" whales are it is he, because he has been fishing for them all his life. So I am inclined to believe, although separated from the northern "right" whales by the warm seas of the tropics, that whales having bone of sufficient length to be valuable do exist in the Antarctic regions. I have felt much satisfaction in listening to the discussion; and, if our greatest enemy is Admiral Fitzgerald, I feel quite confident that the whole feeling of the Navy is unanimous in advocating the despatch of an Antarctic expedition, and with that feeling I give you my most sincere thanks for the way in which my paper has been received.

On the motion being put by the Chairman, a hearty vote of thanks was accorded to the lecturer.

The following letter was read by the Secretary:—

REMARKS ON MR. C. MARKHAM'S PAPER.

The importance of terrestrial magnetism as a subject of enquiry in the regions south of 40° south latitude has already been duly noticed by the lecturer, and the broad features of the large amount of work that remains to be done for that science have been ably enumerated.

I would, however, remark upon the debt of gratitude which the modern seaman owes to his brethren who lived and laboured during the first fifty years of this century, and who, by their observations, in all parts of the world, contributed so much to our knowledge of the earth considered as a magnet. The Antarctic regions being specially under consideration, I have one more name besides that of Ross and his companions which I think should be mentioned—that of Captain Matthew Flinders—who, by his observations of the dip of the needle in southern latitudes, combined with a study of the deviations of the compass in the "Investigator," invented, in 1805, that important item in the correction of the

compass in iron and steel ships, the Flinders bar. In short, if we had not already a fair knowledge of the earth's magnetism in the majority of navigable latitudes, we should be unable to send our thousands of iron and steel ships over the world with the remarkable precision which due care can attain. Each of these ships is a magnet, and if we would know the nature of their magnetism we must first know the nature of their parent magnet, the earth. Now, the distribution of the earth's magnetism is well known to be constantly changing, and there is a vast deal to be learnt of these changes. If, however, we can once obtain a correct knowledge of the earth's magnetism for different epochs, there is little doubt that scientific men will be able to obtain a series of constants, by means of which they will be able to construct in advance those charts of the variation of the compass, and the magnetic dip and force, which are so important to navigation. In fact, we shall be able to treat the subject much in the same manner as the computation of the times of high water in advance.

Both the maritime and scientific world may be said to be full of gratitude of two kinds to naval officers: that for the past, and the more common kind, of a lively sense of favours to come. These favours as regards terrestrial magnetism are locked up in the Antarctic regions, and I hope before long the key will be placed in the hands of naval officers.

ETTRICK W. CREAK,
Retired Captain R.N.,
Superintendent of Compasses, Hydrographic Department.

LEHMANN'S SCHARNHORST.*

By SPENSER WILKINSON.

IN the great drama of the revolutionary and Napoleonic age no episode is more striking, none richer in lessons for our own time, than that of the downfall and the uplifting of Prussia. How was it possible that the Monarchy which had been left in 1786 one of the great Powers of Europe, could in 1806 be utterly crushed in seven weeks? How was it possible again that after six years more, during which Prussia was stripped of half her territories, and half of the rest kept under the iron heel of the conqueror, she could suddenly re-appear as a great Power and put into the field an army as large as that of her Russian allies, and far more efficient than the one she had lost?

The resurrection of Prussia was the work of a group of men, among whom the chief figures are Stein and Scharnhorst, and the life of Scharnhorst is, therefore, necessarily the history of the new creation of the Prussian Army, as the life of Stein is the history of the new foundation of the Prussian State. But to understand how Prussia rose again, it is necessary to understand first how she fell. Sir John Seeley, in his "Life and Times of Stein," has admirably told the whole story in outline, though if we may judge by the biographies of Seeley which appeared in the newspapers at the time of his lamented death, the British reading public has not yet discovered this the most valuable of all his works. Seeley, however, had only imperfect access to the materials for the military history of Prussia, and the purpose of this paper is to draw the attention of the readers of the JOURNAL to the rich store of information contained in Lehmann's more recent volumes on Scharnhorst.

In the sketch of Scharnhorst written by his intimate friend Clausewitz and published in 1832, we are told that if it is always difficult precisely to estimate the activity of a statesman, the difficulty is increased in the case of a man who, like Scharnhorst in the midst of his exertions, kept himself as far as possible out of sight in the background. For this reason Clausewitz found it impracticable to trace by documentry evidence his friend's share in the great events of his time. The hard task which Clausewitz renounced has been performed by Max Lehmann, who has ransacked the literature of the period and the archives of the Prussian War Office to find all that bears upon Scharnhorst's career, and has told the story with a fulness and a sympathy that leave little to be desired, and written with a force and freshness that make his book a credit to German literature.

Lehmann is a disciple of Treitschke's, that is to say, he writes history to glorify Prussia. The partiality of patriotism appears on every page. When a German does a kindly act it is because he is a "kind-hearted German," when a Frenchman or an Englishman does wrong it is because he is French or English; "German" being synonymous with "virtuous,"

* "Scharnhorst." Von Max Lehmann. Leipzig, 1886-7.

and "foreigner" with "vicious." An Englishman may derive a salutary warning from this naïve distribution of adjectives, and Lehmann's bias goes little deeper. He is perfectly honest and accurate in his account of the facts.

The fall of Prussia was due, in the first instance, to the irresolution of her Government in the period between 1803 and 1806.

In the eighteenth century the King was the State, and Frederic William I., who concealed under the garb of a sordid and repulsive personality the essence of a great statesman, learned early the lesson that the State, far more than the individual, must rely on self-help. His hard, unamiable economy endowed Prussia with a force stronger than was possessed by other States of greater area and population. Frederic II., like his father, identified himself with the State, and threw his life into this work which this conception implies. He, too, grasped the fundamental law of the political world, that a State must rely upon its own efforts. Accordingly he clearly thought out his mission—the assertion of Prussia; he closely studied the forces against which he had to contend, and, never losing his grip of his one object, could look back at his death upon a career devoted to a purpose, and therefore great. He left Prussia one of the great Powers of the world.

Frederic William II. retained from the tradition of his century the belief that he was the State, but being a prey to sensual enjoyments he had no guiding purpose, and no single eye with which to see the world as it was. Accordingly he is torn between conflicting aims, looking now to Poland and now to the Rhine; and follows the lead now of one, now of another, of the small men about him, whose claim to be heard was, at the worst, that they pandered to his weakness, and at the best that they had been clerks to Frederic the Great. The chief antagonist of the Prussian purpose (to be a great Power) was Austria, and the accession of Leopold gave Austria a statesman. A few months of negotiation enabled Leopold to divert Frederic William from the Prussian policy, and to turn his attention from Vienna to Paris. Not knowing what he wanted—for though he attacked the French he was longing for a province of Poland—Frederic William invaded France with less than a quarter of his army, in conjunction with less than a fifth of the Austrian Army. The war went on after the first disaster, but as Prussia and Austria were more hostile to one another than to France and more afraid of each other than of the enemy, and as the French to resist the scraps of armies opposed to them called the nation to arms, the allies were treated to a succession of reverses. When the French had conquered the whole left bank of the Rhine, Frederic William discovered that he had really no particular quarrel with them, and by the treaty of Basle retired from the contest and consoled himself for his failure with his new Polish province. He died in 1797, and was succeeded by Frederic William III., a virtuous and intelligent young man, so afraid of deciding wrong that he never in his life decided anything. To such a disposition "a policy of neutrality" commended itself, for it was a phrase that veiled the fact that he had no policy. With the humanity of an age in which personal comfort

was the supreme object he shrank from war, but as the ruler of a great Power he expected to exercise some influence beyond his own borders. His weakness—not peculiar to himself or his time—was that he did not grasp the inconsistency between these two desires. The rights or the interests of a State if challenged must be sustained by force, and to renounce the use of force is to abandon every right and every interest that is challenged.

The concrete cases in which the choice was presented to Frederic William III. were not easy ones. The first was that of Hanover. By the treaty of Basle Prussia had undertaken to guarantee the neutrality of Hanover (although its king, George III., was still at war with France) and the cordon of troops which watched the line of demarcation between the neutral area and the theatre of war included Hanover in its protection. The cordon was withdrawn on the cessation of hostilities in 1800. But in 1803 the war between England and France began again. Prussia must either be content to see Hanover the theatre of war, in which case its conquest by the French was probable, or must occupy the country herself, at the risk of quarrel with one or both parties. Frederic William did not want the French to enter Hanover, as they would then be posted between his own dominions in Brandenburg and his territories on the Rhine. But while he hesitated the French acted. They marched an army into Hanover and occupied the country. He felt aggrieved, but he would not fight; and as this was well understood, the French drew the natural inference that Prussia did not count.

In 1805 came the coalition between England, Austria, and Russia. Frederic William would not join it, and determined to be neutral, mobilising part of his army to prevent a Russian violation of the neutrality of Silesia. But at the outset of the war Napoleon violated the neutrality of the Prussian territory of Anspach by marching an army corps through it. Thereupon the King mobilised his whole army and agreed to a treaty with Russia, binding himself to send an immediate ultimatum to Napoleon, and, failing a satisfactory answer, to join the coalition with 180,000 men. He sent Haugwitz to Napoleon, ostensibly with the ultimatum, but really, as Lehmann has discovered, with secret instructions on no account to bring about a breach. Napoleon delayed the negotiation until after the battle of Austerlitz, when Haugwitz signed the treaty of Schönbrunn, involving a Franco-Prussian alliance and the cession of Hanover by France to Prussia. This cession of course meant war between England and Prussia, and as Frederic William wanted no war he offered to ratify the treaty of Schönbrunn only on the understanding that he was not to annex Hanover, but merely to occupy it until the general peace, when perhaps he thought England would agree to its annexation. Before Napoleon had consented to this change the Prussian Army was placed on a peace footing. Then Napoleon declared the treaty void, and substituted a new one less advantageous to Prussia, but still involving the annexation of Hanover and war with England. This the King accepted. The King had thus played false with the coalition, had revealed to Napoleon his real hostility, and had then shrunk back at the critical moment. If

he had deliberately set out, first to isolate himself, and then to provoke a French attack, he could not have succeeded more perfectly.

In the summer of 1806 the continued presence of the French Army in Southern and Western Germany convinced him that he had made a mistake. The discovery that Napoleon had offered to restore Hanover to England made him afraid of being attacked by surprise, so he again mobilised his army, opened negotiations with the Tsar who had not yet made peace with France, and sent an ultimatum to Napoleon. From the extreme of timidity he had passed to the extreme of rashness. If the King expected Russian help against the French attack it was in the highest degree imprudent to precipitate that attack by an ultimatum, and thus bring on the decisive struggle before the co-operation of Russia was assured, and before the Russian Army could be brought up.

These preliminaries have been recapitulated in order to show how in the management of its policy, in the stages preliminary to the military measures proper, the King's government had laid the foundations of defeat. The military conduct of the war was such as might be expected to accompany this kind of policy. No one could reasonably doubt, after the campaigns of Austerlitz, that a war against Napoleon would be a life and death struggle. Yet the troops in the Eastern provinces, to the number of 33,000 men, were not included in the mobilisation. The essence of good management is unity of direction. The King appointed the Duke of Brunswick to be commander-in-chief of the army; then he appointed Prince Hohenlohe to command half of it, and finally took the field himself. Accordingly no order could be given without his consent; he would not consent unless convinced, and could never be convinced so long as anyone raised objections. The result was that the army was commanded by an irregular committee, with an irresolute chairman, at which a dozen persons attended and gave their opinions, and in which Hohenlohe and his staff-officer conceived their mission to be to oppose whatever the Duke of Brunswick suggested. With such a council of war, instead of a commander-in-chief, no successful war was possible. Without a policy, without a rational organisation of the command, with little more than half the actually available force in the field the Prussians were in any case sure to be beaten by Napoleon. But the extent of the disaster was increased by other causes.

Not one of the generals in the army, except perhaps Blücher, seems to have understood war. They were perfect in the drill of fifty years before, but had no conception that a battle and a pre-arranged review are two different things. Outposts and reconnaissance duties were unknown to most of the officers. Skirmishing was despised. Accordingly at every turn the troops were at a disadvantage against the French. Yet how much could have been done with them by a general like Wellington, is clear from the excellent behaviour of the men in the battles of Jena and Auerstädt. There were good officers in the army. Scharnhorst, Gneisenau, York, Bülow, and others who became famous in the later wars were company or field officers. But none of these rising men were in authority. Promotion by seniority was the rule, and the generals were

almost without exception old and incapable. The capitulations that followed within the weeks after the great defeat showed the military incompetence of the bulk of the superior officers, the brilliant exception of Blücher serving only to show more clearly what the others ought to have been.

One cause which increased the gravity of the disasters ought not to be forgotten. The idea that the defence of the country was everybody's duty did not exist. It was thought wrong for the officers in command to seize upon provisions or stores for the benefit of their men. In the retreat from Jena to Magdeburg, and from Magdeburg to Prenzlau, the troops suffered incredible privations. They passed starving through a country in which there was plenty to eat; they were not allowed to touch it, while their French pursuers had the full benefit of it. The nation might be destroyed, but private property must be respected.

When the peace came, Prussia had to be built up anew from the foundations. The great difficulty was the King, for he could no more make up his mind after than before. Ever since his accession the army had been his pet care. He had had a Royal Commission of field-marshals and generals sitting for years, but it had rejected all the pet ideas of the reformers. Now he appointed a new commission, of which the leading spirit was Scharnhorst.

When Hanover was declared neutral in 1796 it was covered by a combined cordon of Prussian and Hanoverian troops. The Prussians were under the Duke of Brunswick with his headquarters at Minden, then the residence of Stein. The Hanoverian corps was commanded by Count Walmoden, Stein's brother-in-law, whose headquarters were also at Minden. Both Stein and Brunswick made the acquaintance of Walmoden's chief staff-officer, the Hanoverian Major Scharnhorst, who had made a name by his splendid bravery in the recent campaigns, as well as by his remarkable contributions to military literature. To his cool, clear head, and stout heart it was mainly due that the Duke of York had made good his retreat from Dunkirk in 1793, and he had proposed, planned, and in great part conducted the bold exploit by which the garrison of Menin had cut their way through the besieging army in 1794. He had served in the cavalry, in the artillery, and on the staff, and had been a military instructor. The "Military Library" (1783-4), and the "New Military Journal" (from 1788 onwards) were standard periodicals, for which he was responsible, and he was the author of a "Handbook for Officers of the Applied Military Sciences," and of a "Military Pocket Book for Field Use." The Prussian headquarters after making the acquaintance of Major Scharnhorst, and seeing how he fulfilled his duties, reported to Berlin that he was an eminently practical officer, and that it would be a real acquisition if he could be induced to enter the Prussian Service. A few months later the offer was made to him of a majority in the Prussian artillery. This offer was declined. But in 1800, Scharnhorst, now Lieut-Colonel, finding that not being a nobleman he had no future in the Hanoverian Service, intimated that he was willing to accept a similar proposal. The young King Frederic William III., when Crown Prince,

had made his acquaintance and received a favourable impression, so that no difficulties were raised, and on May 1st, 1801, Lieut-Colonel Scharnhorst was appointed to the 3rd Prussian Regiment of Artillery, and in the following year received his patent of nobility.

One of his first appointments was that of instructor in the professional school for officers at Berlin, which he very soon transformed into what would now be called a staff college. His lectures at this institution were the beginning of Prussian systematic instruction in staff duties, and in the theory of war. At the same time he founded the Berlin Military Society, an institution for the delivery of lectures resembling in many ways that which publishes this JOURNAL. In 1804 Scharnhorst was transferred to the staff, becoming one of three quartermasters to whom the study of three theatres of operations probable for Prussia was assigned. In 1806 he was the Duke of Brunswick's chief staff-officer, and after that general's fall at Auerstädt, attached himself during the retreat to Blücher, who attributed to him whatever success attended his efforts to save his corps. In the subsequent campaign in Prussia Scharnhorst greatly distinguished himself, especially by his management at Eylau of L'Estocq's corps, by which that battle was saved.

Scharnhorst's modesty and bravery had attracted the King, who promoted him in July, 1807, to Major-General, and placed him at the head of the new Royal Commission to re-organise the army. From that time onwards Scharnhorst's whole life was devoted to the one task of preparing Prussia to renew the struggle for her independence. In this effort he combined a Napoleonic activity with the patience of Job, and with a modesty all his own. Of the Royal Commission he was the moving spirit; but it was laborious and harassing work, for the King appointed to it as many re-actionaries as reformers. By degrees Scharnhorst persuaded him to modify its composition, so that the reformers became a majority, but he never could induce the King to adopt a single measure in its entirety, or to agree to more than a tithe of what the Commission proposed.

In June, 1808, Scharnhorst became Adjutant-General, with the duty of reporting all military matters to the King; in March, 1809, when the Ministry of War was re-organised, he became also chief of the general war department, or head of what would now be called the general staff; in 1810 he further undertook the direction of the military academy, or reformed and enlarged staff college; and he was also Inspector-General of the corps of engineers. Thus, between 1808 and 1810, almost the whole work of organising and managing the army was concentrated into his hands, and there was no department which he touched without transforming. Clausewitz has given a brief survey of Scharnhorst's aims in the re-organisation of the army. They were, he says :—

"1. A sub-division, armament and equipment corresponding to the new conditions of war.

"2. To recruit the army from a better class, and to raise its tone. Hence the abolition of the enlistment of foreigners, an approximation to

universal service, abolition of corporal punishment, and the foundation of good institutions for military education.

"3. A careful selection of the officers placed in command of the larger units. Seniority, which before had had too extensive a sway in the Prussian Army, and had given it its leaders, was restricted in its rights, and the principle set up that those should be preferred who had most recently served in war, or had in some way distinguished themselves in it. As a fact, most of the men who afterwards were the most distinguished leaders were first brought to the front under Sharnhorst's administration.

"4. New exercises suited to modern war."

These headings, though they classify what was done, give hardly an idea of its extent. Scharnhorst induced the King to sub-divide the army into divisions of all arms, reduced to brigades when Napoleon, by the Convention of 1808, obliged Prussia not to increase her army beyond 42,000 men, and not to create new cadres. At a time when the gun-foundries at Berlin and Breslau had been destroyed by the French, Scharnhorst managed to produce guns, muskets, and powder for a much larger army than Prussia possessed, and to provide for the troops the overcoats they had lacked in 1806. His great leading idea was to interest the whole nation in the national defence, and to be able to call the whole population to arms when the time should come. The Commission over and over again proposed the formation of a great reserve, or landwehr, which was to be separate from the army, and to include, as far as possible, all the men capable of arms. But the King would have no such revolutionary scheme. The most that could be had from the King was his consent to allow trained men to be sent on furlough, and their places taken by recruits, and though only a small number of such furlough-men were permitted for each company, it was by making the most of the device that Scharnhorst produced the trained reserves that swelled the ranks in 1813. The King would neither introduce universal service, nor any kind of militia or landwehr until the enemy was at hand, that is, until too late for such measures to yield a practical result.

One of Scharnhorst's strongest convictions was that good leaders must be selected, irrespective of seniority. He and his comrades on the commission had before their eyes the example of Napoleon and his marshals, all of whom were promoted without regard to age or seniority, on account of their tried ability. Accordingly, the commission made drastic proposals, which the King would not endorse. They were, however, able to abolish the exclusion from the commissioned ranks of all but nobles, and to introduce the system by which future officers were elected by the officers of the regiments. They probably hardly foresaw the effect of this election in perpetuating in fact, though not in theory, the exclusiveness of the system. In the department of tactics, the essential change effected was that manœuvres were substituted for pre-arranged reviews, and due weight given to the working of the three arms in common. Scharnhorst himself trained up the new generation of staff officers.

It was above all a change in the spirit of the army that Scharnhorst sought to bring about, and in this he succeeded. He was the founder of a school, and when he died he left a number of disciples who represented the ideals for which he had worked. The body of Prussian officers did not cease to be a caste, but it became to some extent a caste of which the principle was duty. One thing Scharnhorst could not do. It was impossible to induce the King to have a policy. He had been thoroughly overawed in 1806, and nothing could bring him a second time to stand up against Napoleon. The whole Prussian patriotic party was for joining with Austria in 1809. Scharnhorst was ready, but the King dare not budge. In each succeeding year the patriots were eager to rise and fight. But the King only went deeper into dependence upon France. He had to dismiss Stein; to accept Scharnhorst's resignation—a mere form, for Scharnhorst without the official position continued to direct the work of the war office, and he kept his post at the staff and its college—and finally to enter the war against Russia on Napoleon's side.

In December, 1812, the Grand Army was no more, and Napoleon was on his way back to Paris. By the end of the month York had taken the Prussian contingent over to the Russian side. Prussia's opportunity had come at last. The army knew it, and the generals in command spontaneously made their arrangements to fight the French. The people knew it, and began their preparations. The statesmen knew it, and besought the King to act. But the King was still blind and deaf. He thought generals, statesmen, soldiers, and people revolutionaries; was indignant at their disregard of his heaven-sent authority, and sent to assure Napoleon of his fidelity. The question arose in many a Prussian heart whether a spiritless King was worth keeping. Alexander sent him an ultimatum. Then at last Frederic William yielded, sorely against his will, to the necessity of being on his country's side, and the treaty with Russia was signed. A month later Prussia had 150,000 men under arms, and was levying 120,000 more.

Scharnhorst now obtained the royal approval to the projects for landwehr and landsturm, and to the suspension of all exemptions from military service—but all three measures only for the duration of the war. Arms, men, leaders, and the right spirit were now all forthcoming. Scharnhorst's six years of perseverance and patience had borne fruit. Only one man had learned nothing. The army had been raised, armed, organised, and trained under Scharnhorst's auspices; it remained to put him in command of it. Frederic William never seems to have thought of such a step for a moment; he accepted Scharnhorst's modest proposal that Blücher should command, and allowed the first soldier in his dominions to be merely Blücher's chief of the staff—a position in which he had little more influence on the course of the war than when he had been seven years before chief of the staff to the Duke of Brunswick.

In the first great battle Scharnhorst was wounded. Frederic William let him go off, with his wound, on a mission to Vienna. On the journey, which was arduous, and which caused his wound to become serious, he wrote to his daughter—"I want nothing from the whole world. What is

valuable to me it will never give me. If I could command the whole (army), I would give a great deal for that. I consider myself, compared with them all, quite capable of it. If I cannot have that, all things are indifferent to me. In battle I can always find a place. For distinctions I care nothing; as I do not receive those I have deserved, any other is an insult, and I should despise myself if I thought otherwise. All my orders and my life I would give to have the command in chief for one day."

Frederic William's ingratitude had hit him very hard. His wound took a turn for the worse, and a few weeks after writing the words just quoted he died.

NAVAL AND MILITARY NOTES.

NAVAL.

HOME.—The following are the principal appointments which have been made: Captains—F. R. Boardman, C.B., to "Warspite"; J. E. Blaxland to "Tamar"; J. E. Pattisson to "Edinburgh," and Frank Finnis to "Royal Arthur." Commander—C. W. Winnington-Ingram to "Vivid."

The first class cruiser "Gibraltar," Captain A. Macleod, has arrived at Portsmouth from China with the paid-off crews of the "Archer" and "Peacock," and is to be paid off into the A Division of the Reserve. The third class cruisers "Curacoa," Captain Gibson, and "Champion," Captain Rooke, have arrived from Australia and the Pacific, and will be paid off at Plymouth and Sheerness respectively. The old troop-ship "Tamar" is to proceed to Hong-Kong, where she will take the place of the "Victor-Emanuel" as receiving ship.

The trials of the gun mounting that is to be supplied to all ships of the "Majestic" class, with the exception of the "Cæsar" and "Illustrious," are now concluded, in time to allow the mountings to be manufactured for the "Majestic" and "Magnificent" as soon as they are wanted. Sir William Armstrong and Co. have invented an arrangement, whereby the energy absorbed by the hydraulic presses on the recoil of the gun is utilised to run the weapon out again into the firing position, while the ammunition is sent up by the hoists into a central position in the barbette. The arrangement is an exceedingly ingenious one, and will save more than half the time now occupied in firing heavy ordnance. In the plan they first introduced the gun was run out by means of springs, but in repeated trials these broke, and the system had to be abandoned. Fortunately the hydraulic apparatus has answered satisfactorily, for upon its success depended the completion of the battle-ships by the end of the year.

The "Ferret," torpedo-boat destroyer, has completed, off Plymouth, the three hours' full-power trial of her machinery under forced draught, with very satisfactory results. The following were the mean results:—Pressure in stokeholds, 4·6 inches; vacuum, starboard 26·5, port 26·5; revolutions, starboard 338·1, port 334·4; I.H.P., 4,300. The highest I.H.P. obtained was 4,430, the same that the contractors obtained during their full-power trial on the Clyde, when a speed of 27·5 knots was registered. On the late trial the speed attained was 25·5 knots. The engines worked extremely well, and the boilers (of the Normand type) generated steam without any signs of priming. This satisfactory result reflects great credit on the designers and builders of the "Ferret," Messrs. Laird Bros., of Birkenhead, who have received an order for three of the new 30-knot boats recently designed by the Admiralty.

The new first class cruisers to be built by contract are to be called the "Diadem," "Europa," and "Niobe," whilst the vessel of the same class which is to be constructed at Chatham is to be called the "Andromeda." Coming to second class cruisers, the one to be built at Portsmouth is to be called the "Gladiator," whilst at Chatham we are to have a "Vindictive," and the two vessels to be laid down at Devonport are to be named the "Arrogant" and the "Furious." Sheerness will for some time be engaged on building two third class cruisers, which are to be christened "Pelorus" and "Proserpine."

In last month's Notes we gave the dimensions of the new second class cruisers, which appeared in a return issued by the Admiralty for Parliament, but fuller details are now to hand from Devonport, where two of the ships, the

"Arrogant" and the "Furious," are to be constructed. The profile and plans for guidance in the construction of the vessels have been received, and the drawings show that the new vessels will be of a totally different type to any cruisers yet designed. Their length will be that of the existing medium second class cruisers of the "Astræa" type, 320 feet; but they will have an enormous beam, the plans providing for a breadth of 57 feet, only 3 feet less than the "Edgar" type of first class cruisers, each of which has a length of 360 feet. During their construction several new features of a distinctly novel character are to be introduced. The most important, perhaps, is the manner in which the hulls are to be constructed. From the ram right aft as far as the termination of the engine and boiler rooms, the hulls are to be built of 2-inch nickel steel plates, which have been first treated by a hardening process, the character of which is known only to the Admiralty and to the contractors from whom they are to be supplied. It is claimed that the nickel plates thus treated have a remarkable amount of resistance power—sufficient, in fact, to smash and render practically harmless the ordinary projectiles used for modern ordnance of medium calibre. The "Arrogant" and "Furious" are to be built without a poop, but in order that protection might be afforded by a superstructure each vessel is to have a topgallant forecastle extending right aft to the vessel's waist. Their armament has not yet been decided upon, beyond the fact that all the broadside guns, together with the bow and stern guns, will be of the Q.F. type. It has been proposed to fit sponsons on each bow and quarter in order to give the greatest possible amount of right ahead and right astern fire, but this is not likely to be decided upon for several weeks. Until the equipment of the vessels has been approved of it is difficult to estimate the total cost of each, but it is believed that in consequence of the expensive character of the hulls, they cannot possibly be built for less than £320,000 each.

The "Arrogant" is to be built on No. 5 slip, and the blocks have already been laid in readiness to receive the keel-plate. The ships will be built with brackets or longitudinal frames of the same type as those used in the construction of first class cruisers and battle-ships, and not with the ordinary frames. On the construction of the "Arrogant's" hull the Devonport officials have been authorised to spend during the present year the sum of £61,870, of which sum £20,800 is allowed for labour alone, whilst in the hull of the "Furious," for the same period, £30,940 will be spent in labour and £31,800 in materials. In consequence of the large amount of work in hand at Keyham, it has been decided to have the new vessels' engines and boilers built by contract.

The officials at Chatham Dockyard have received instructions from the Admiralty to commence the actual building of the "Vindictive." When the building of this ship and her sisters is commenced, there will be no fewer than thirteen second class cruisers for the Royal Navy under construction, viz., seven in the Government Dockyards and six at private yards. In the two previous years, moreover, eight protected second class cruisers were passed into the Fleet Reserve, comprising the "Cambrian," "Astræa," "Bonaventure," "Fox," "Flora," "Forte," "Charybdis," and "Hermione." The "Vindictive's" engines, like those of the "Forte" and "Minerva," are to be constructed in Chatham Dockyard. They are to be capable of developing 10,000-H.P. under forced draught.

Messrs. Price and Son are making such progress with the new docks at Portsmouth that they hope to be able to comply with the demand of the Admiralty to complete No. 15 in another fifteen months. Some time since they overcame the leak at the entrance, but while this part of the work was in hand they had to leave a heavy bank of earth between the old and the new excavations. This bank, known as the dumpling, is now being removed, but it is slow work, as there is no opportunity of putting the steam navvy in operation. Between the dumpling and the head of the dock, however, they have got on so rapidly that every day marks

an appreciable advance. The foundation, consisting of 3 feet of concrete, has been laid; over this there is 7 feet of solid brickwork, and above this the granite blocks, from Portland, are being laid. The sides, too, have been commenced. Here the concrete is 4 feet thick, the brickwork is of the same thickness as the foundation, and inside of this comes the masonry. The structure will, therefore, be of enormous strength, and, given good workmanship, the term "permanent" as applied to the work is certainly not misplaced.

The Admiralty have placed orders for nine torpedo-boat destroyers, which are to have a trial speed of 30 knots. It is understood that their lordships, after carefully considering the entirely new design made and submitted by Messrs. Laird Bros., of Birkenhead, for a fast sea-going torpedo-boat destroyer, with machinery guaranteed to attain and maintain the remarkable speed at sea of 30 knots, have decided to place with Messrs. Laird Bros. an order for three of these vessels, relying on the unbroken record of success of the 27-knot torpedo-boat destroyers "Ferret," "Lynx," "Banshee," "Contest," and "Dragon," which Messrs. Laird designed. Both as regards hull and machinery, the new vessels are to be built on the same principles as the earlier ones, and, like them, will be fitted with the same type of water-tube boiler, a modified form of the Normand boiler. It is confidently expected that in their sea-keeping qualities they will be fully equal to their predecessors, which have called for such favourable comment in this respect.

It has been decided to carry out a further series of experiments with the pneumatic gun at Dale Point, Milford. The former experiments were under the direction of the Joint Naval and Military Committee on Defence, but now the arrangements will be in the hands of the Military Ordnance Committee. In order that the committee might have the fullest freedom in carrying out the experiments, the Admiralty have decided to give them the "Harpy" as a target ship, instead of, as was the case last year, simply lending her. She will be manned by a crew of Royal Engineers. Over a hundred projectiles have been supplied in readiness for the experiments, and the most interesting of the series will probably be the firing of a gun at the vessel after her engines have been put to work at full speed.

The new battle-ship "Renown" was launched at Pembroke on the 8th ult. She is a first class twin-screw, armour-clad battle-ship, and is the only vessel of her class either built or building, her design which was prepared under the direction of Sir W. White, being purely experimental. She is the largest sheathed battle-ship ever built, and is intended to keep the sea for long periods of time on foreign stations where dock accommodation is not conveniently accessible, and is designed to pass through the Suez Canal. Her principal dimensions are:—Length between perpendiculars, 380 feet; extreme breadth, 72 feet 4 inches; load draught of water, 26 feet 9 inches; displacement 12,350 tons; freeboard, forward 25 feet, amidships 27 feet 3 inches, aft 19 feet 3 inches. She has double bottoms which extend for more than half her length in the central part, the outside plating varying in thickness, the thicker plates being nearest the keel, and the plating being doubled in certain places to ensure strength of structure and for other purposes. The vessel is built throughout of steel with the exception of her stem, stern-post, and shaft brackets, which are of phosphor bronze, the stem being shaped to form a formidable ram. A thick deck, which is arched down until it reaches the double-bottom, encloses the engines, boilers, and other vital parts. The frames above the arch-shaped middle deck—as it is technically termed—are kept back from the ship's side so as to form a shelf on which the lower edge of the armour plates at the sides rest across the ship. At the termination of the middle deck, at either end are curved steel armour-plated bulkheads, the convex part in each case being toward the extremities of the ship. These bulkheads rest on the lower deck, and extend to the same height as the armour at the sides, forming with it a complete belt and enclosing the citadel, in the foremost and

aftermost parts of which strongly armoured redoubts are constructed. The lower deck, which is practically the continuation of the middle deck, without the citadel, is constructed of two plates, each 1 inch thick; the armour plates, which are all of Harveyised steel, varying in thickness on the cross bulkheads from 6 inches to 9 and 10 inches, and on the sides from 6 inches to 8 inches. At both ends of the ship, outside the citadel, the side plating is ·716 inch thick, except in the wake of the 6-inch B.L.R. guns, where casemates formed of 6-inch armour, with rear plates 2 inches thick, are fitted. The two redoubts are plated with armour 10 inches thick, while the conning tower forward has 12-inch armour and the after one 3-inch. The armour plates on the belt and surrounding the redoubts are fitted against teak wood backing and bolted through that and two thicknesses of ½-inch plates secured to the frames behind. The bottom of the ship has been sheathed with teak wood 4 inches thick, which will be coppered.

The "Renown's" armament will consist of four 10-inch B.L.R. guns, two in each barbette, the centre line of the guns being 27 feet above the water line, and ten 6-inch B.L. guns, four in casemates on the upper deck and six in casemates on the main deck, the latter being on a level with the upper edge of the armour belting, the upper deck being next above it. She will also carry eight 12-pounders and twelve 3-pounder Q.F. guns, and a number of Maxim guns. She has five torpedo-tubes—one above water at the stern and two on each side submerged—all fitted to discharge 18-inch Whitehead and R.G.A. torpedoes, of which twenty-two will be carried. The propelling machinery consists of two sets of triple-expansion engines, each with three vertical cylinders, the diameters of which are:—High pressure, 40 inches; intermediate pressure, 59 inches; low pressure, 88 inches. The high-pressure cylinders are fitted with piston valves, and the intermediate and low-pressure cylinders with double posted slide valves. The length of stroke is 51 inches. The engines are estimated to make 100 revolutions per minute with forced draught, and under these circumstances they will be required to develop collectively 12,000-H.P., while with the natural draught they will be required to develop 10,000-H.P. Her engines and boilers are being supplied by Messrs. Maudslay, Son, and Field, at a cost of £83,560, exclusive of £3,135 for auxiliary machinery not included in the specifications. The total estimated cost of the hull is £601,927, of which £588,848 will have been expended at the close of the current financial year, leaving £99,774 to be subsequently spent to complete her. The "Renown" has bunker stowage for 800 tons of coal at load draught, but in cases of emergency another 800 tons can be stowed on board. Her full complement of officers and men will be 674. When launched the total weight in the ship amounted to 6,800 tons.

ARGENTINE REPUBLIC.—Messrs. Armstrong, Mitchell, and Co. launched at Newcastle last month the cruiser "Buenos Aires," built for the Argentine Government, the naming ceremony being performed by Señora Rivadavia, wife of Captain Rivadavia, of the Argentine Navy. The vessel's dimensions are:—Length, 396 feet; breadth, 47 feet 2 inches; draft, 17 feet, 7 inches; displacement, 4,500 tons. She is constructed of steel, the underwater portions being sheathed with wood and coppered. Throughout her whole length she is protected by a curved steel armour deck, varying in thickness from 1½ inch on the horizontal parts to 3 inches on the sloping sides and 5 inches in the wake of the engines. This deck completely covers all the machinery, magazines, and steering gear, and additional protection is also afforded by the coal bunkers, which are carried along the vessel's sides, and are capable of holding 1,000 tons of coal; a supply which would enable the vessel to traverse a distance of some 8,000 knots at a moderate speed. The vessel is fitted with twin-screw machinery of 17,000-H.P., and it is expected that this will give her a speed of 24 knots. She will thus be the fastest cruiser in existence. The "Buenos Aires" will be armed

with Q.F. guns of the latest Elswick pattern. The armament, which is exceptionally powerful, will consist of two 8-inch Q.F. guns placed one forward and one aft, ten 4·7-inch Q.F. guns placed on the broadsides, sixteen 3-pounder Q.F. Hotchkiss guns, six 1-pounder Q.F. Hotchkiss guns, and five torpedo-tubes.

BRAZIL.—The "Benjamin Constant" is at last ready to commence her duties as training-ship, for which purpose she has been specially built. The vessel was built at the "Forges et Chantiers de la Méditerranée" at La Seyne, near Toulon, and was launched in 1892. She is of steel, wood sheathed and coppered, has a double bottom, and a 2-inch armoured deck. Her principal dimensions are as follows:—Length, 240 feet; beam, 46 feet; mean draught, 16 feet 8 inches; displacement, 2,750 tons. The ship has a single screw, driven by triple-expansion engines, developing 2,800-I.H.P. under forced draught, and giving a speed of 15 knots. The coal capacity is 260 tons, which at 10 knots speed give a cruising radius of 6,000 miles. The ship is full-rigged, but the fore and main masts have military tops; the sail-area is 1,800 square yards. The armament consists of four 6-inch Q.F. guns in sponsons, two forward and two aft, and eight guns of a similar calibre in the battery, two 57-millimetre Nordenfeldt, six 25-millimetre and four 17-millimetre mitrailleuses, which are mounted in the tops and different parts of the ship, and there are also four torpedo-tubes. At her trial trip she maintained a speed of from 14 to 15·5 knots for eight hours.—*Revista Marittima Brazileira.*

FRANCE.—The following are the principal appointments which have been made: Capitaines de Vaisseau—Compristo to "Algésiras"; Mallarmé, member of the Council of Works; Saget de la Jonquère to "Friant." Capitaine de Frégate—Colin to "Annamite." The death is announced of Rear-Admiral Fleuriais, who was last month appointed to the command of the Atlantic Division. —*Le Moniteur de la Flotte.*

There is not much news from the French ports to record this month. The "Amiral Duperré" flag-ship of Rear-Admiral Turquet de Beauregard, second-in-command of the Reserve Squadron of the Mediterranean, has been on shore in the Gulf d'Juan, damaging her bottom to such an extent, that the ship has had to be docked at Toulon for repairs; it is estimated that the necessary work will cost 80,000 francs, and is not likely to be completed before the middle of August. In the meantime the Rear-Admiral has temporarily transferred his flag to the "Caïman."

The completion of the work on board the "Hoche" and the rapid progress being made with the alterations to the "Brennus" have enabled the dockyard authorities at Brest to push on the construction of the new battle-ship "Charlemagne," and it is now pretty certain she will be launched in October next—eighteen months after the laying of her first keel-plate.

The new second class cruiser described in the Annexe to the Budget as "E 4" is to be named the "Protet" after the Rear-Admiral of that name, who was killed at the capture of the Chinese fort of Nanyao on the 17th May, 1862, while in command of the French squadron in China; she is to be constructed at a private yard. The new aviso known as "S 2," to be built at Rochefort, is to be named the "Kersaint."

On the return of the squadron from Kiel, Rear-Admiral Ménard will transfer his flag to the "Bouvines," which ship, it is hoped, will have completed her trials by that time and be ready for full commissioning; the "Hoche" will then take the place of the "Suffren" as flag-ship of the Vice-Admiral, commanding the squadron of the North, and the latter vessel will be placed in the Reserve, although it is unlikely that she will be employed again for further sea-service.

The first class battery-cruiser "Cécille," which has been undergoing a thorough overhaul and repair since her collision with the English steamer

"Ferrando" in the autumn of 1893, including among other alterations the substitution of Q.F. 16-centimetre and 14-centimetre guns for the old armament, has now completed her trials at Toulon in a most satisfactory manner. Certain important modifications have been made in her machinery, so that on her forced draught trial the engines developed nearly 10,500-I.H.P., giving a resultant speed of 19·8 knots, the mean speed for the two hours' run being 19·5 knots; this result gave 700-H.P. and ·5 of a knot more than the H.P. developed and the speed obtained, when the ship underwent her trials on her first completion for sea some four years ago. Four new coal bunkers have also been added, which will considerably increase her coal stowage. The substitution of the Q.F. guns has necessitated also an enlargement and re-arrangement of the magazines; eleven new ammunition hoists for the 16-centimetre and 14-centimetre, and four for the 47-millimetre and 37-millimetre Q.F. guns have been fitted; these are all worked by electricity. Four 47-millimetre Q.F. guns have also been added to the armament. The "Cécille," which was launched in 1888, is 378 feet 9 inches long, has a beam of 49 feet, and with a mean draught of 21 feet a displacement of 5,766 tons; the engines develop 10,200-I.H.P.; the armament now consists of eight 16-centimetre (6·3-inch), ten 14-centimetre (5·5-inch), and twenty 47-millimetre and 37-millimetre guns, all Q.F., with four torpedo-tubes.

The new coast-defence battle-ship "Valmy" has also been satisfactorily continuing her trials, with twelve boilers alight out of sixteen; the engines developed 7,507-I.H.P., giving a speed of 15·4 knots; during a two hours' full-speed trial 8,555-I.H.P. was developed, being 150-H.P. over the contract; the corresponding speed was 15·9 knots, coal consumption 0·889 kilogrammes per H.P. per hour.

The third class cruiser "Linois" has completed her preliminary trials at Toulon, and will now commence her official ones for acceptance; as during a seven hours' run the vessel averaged about 20·5 knots, it seems probable that she will make over 21 knots under forced draught.

The new torpedo-boat, No. 185, constructed by M. Normand, of Havre, during a three hours' trial run made an average of 25·5, being a knot and a half over the contract speed.

Dock No. 6 at Cherbourg is to be lengthened 113 feet, which will give it a total length of 380 feet; the work is to be commenced next year, and the estimated cost is 600,000 francs.

The first class torpedo-boat, No. 20, while on passage from Saint-Nazaire to Brest, foundered with the loss of seven of her crew. She left in fine weather in company of another boat, No. 119. On arriving in the Straits between the island of Aix and the mainland the breeze had freshened, whilst a nasty cross sea was running, and the torpedo-boat, being struck on the beam by a heavy wave, capsized, filled and went down; her consort, which was ahead of her, succeeded in rescuing three of the crew by means of her Berthon boat, but the officer in command and the remaining men were unfortunately drowned. No. 20 was a boat of an old type, and was only 86 feet long, with a displacement of 33 tons.

When the Parliamentary Commission into the Navy lately visited Toulon, the order was given to mobilise eight of the torpedo-boats of the Reserve; according to the official report sent in to the Minister of Marine by Captain Barnaud, Director of the Submarine Defences of the Port, in three hours after the order to mobilise was given, the boats were leaving the harbour with the members of the Commission on board. All the stores and provisions had to be drawn, as well as the torpedoes for each boat, and nothing seems to have been forgotten, as when the boats got outside the harbour some excellent practice was made with the torpedoes at targets taken for the purpose.

A writer in *La Marine Française* draws some comparisons between the armoured cruiser "Dupuy-de-Lôme" and the new second class cruisers of the "Friant" type, unfavourable to the latter.

"Dupuy-de-Lôme."	"Friant."
Cruising Radius.	Cruising Radius.
At 10 knots—9,400 miles.	At 10 knots—7,065 miles.
,, 14 ,, —6,000 ,,	,, 15 ,, —4,120 ,,
,, 17 ,, —3,900 ,,	,, 17 ,, —2,248 ,,
Coal capacity—1,200 tons.	Coal capacity—730 tons.
Highest speed—19·8 knots.	Highest speed—19 knots.

The lines of the "Dupuy-de-Lôme" are so good, that at 17 knots speed the consumption of coal, viz., 123 tons in 24 hours, with an I.H.P. of 6,200, is no more than in the "Friant," a vessel of 2,600 tons less displacement; the turning circle of the "Dupuy-de-Lôme" is also less than that of the "Friant," even when the former ship is only using one screw, moreover the "Friant" and her sisters are all deficient in stability; in spite of these facts, the Ministry of Marine, so the writer complains, continues to build vessels of the "Friant" class, but lays down no more "Dupuy-de-Lômes."—*Le Yacht, Moniteur de la Flotte, Le Temps, etc.*

GERMANY.—The following are the principal promotions and appointments which have been made: Rear-Admiral—von Reiche to Vice-Admiral. Captains—Plüddeman and Tirpitz to Rear-Admirals. Corvette-Captains—Flichtenhöfer, Schneider, Borckenhagen, Oelrichs to Captains. Admirals—Freiherr von der Golz released at his own request from the post of Commanding Admiral of the Fleet on account of ill-health, and placed *à la suite* of the Navy at the head of the list of officers; Knorr from Commander-in-Chief at Kiel to Commanding Admiral of the Fleet. Vice-Admiral—von Reiche to temporary command at Kiel. Rear-Admirals—von Diederichs to command of the Training-ship Squadron during the ceremonies connected with the opening of the Baltic and North Sea Canal; Oldekop to command of ships of the Reserve Squadron during opening festivities of Canal. Captains—Lavaud to "Kaiserin Augusta"; von Schuckmann (Hugo) to "Stosch"; Rötger to "Stein"; Schneider to "Moltke"; Borckenhagen for service at Ministry of Marine. Corvette-Captains—Wallmann to "Pelikan"; von der Groeben to "Seeadler."—*Marine Verordnungsblatt.*

NORTH SEA AND BALTIC CANAL.

The following description of the North Sea and Baltic Canal has been compiled from an interesting German pamphlet by Herr C. Beseke on the Canal, giving a detailed account of its history, construction, and importance from a commercial and military point of view, with some additional details taken from the descriptive article in the *Times*. The chart and plans are reproduced from originals published under official authority.

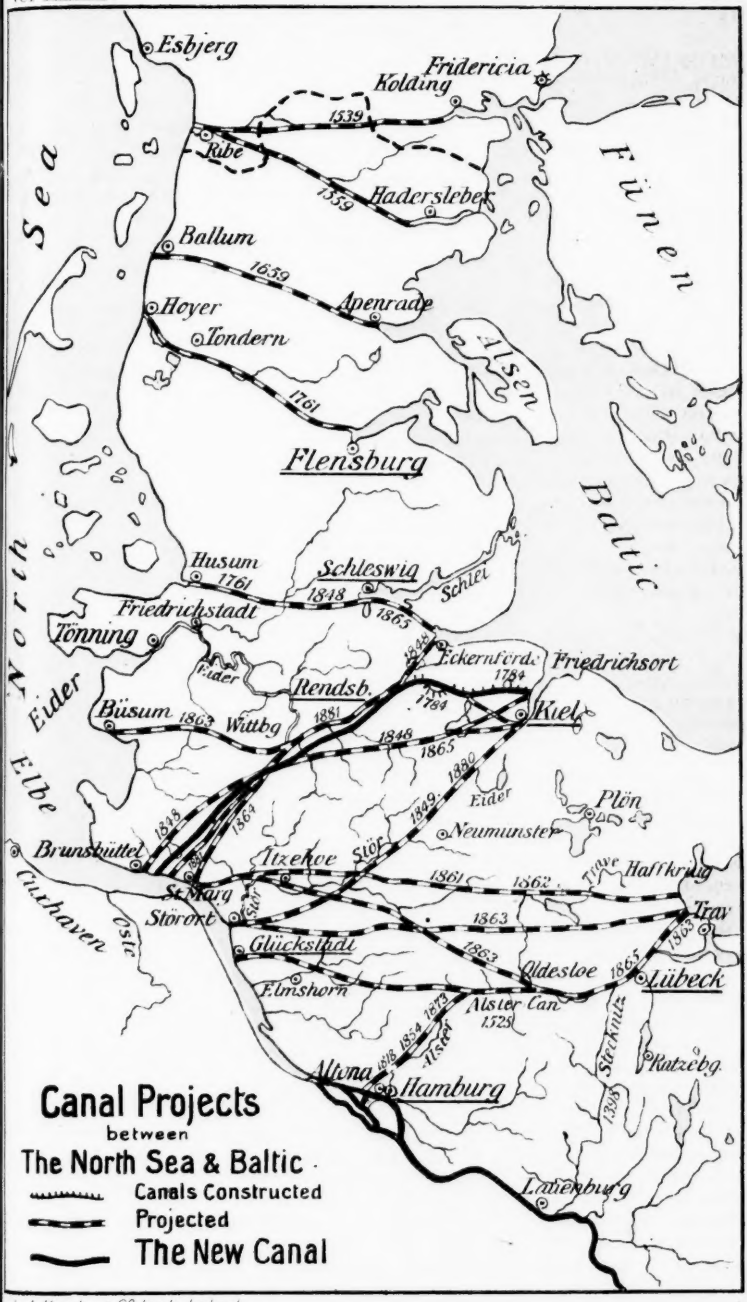
The idea of a canal connecting the two seas, which would materially curtail the voyage to the Baltic and also largely decrease the risks from what was always considered a dangerous sea route, dates as far back as the 14th century, and since the 16th century no less than sixteen proposals for such a work have been made, only one of which, however, has been actually carried out, the last nine being all brought forward between the years 1863 and 1881.

Plate No. 24 shows the canals which have been made at various times or have been projected. The oldest was the Stecknitz, which connected the river of that name with the Delvenau, and formed an indirect water-way between Lübeck and Hamburg; it was commenced in the year 1391, and completed in 1398, but, owing to the very small depth of water, was never of any commercial value for traffic. About the middle of the 16th century, when Cromwell was Protector, a proposal was made by the Dutch authorities to those of Lübeck to join in deepening the Stecknitz Canal, and making a complete and practicable water-way through to the North Sea; but the Danish Government, afraid of the damage which might accrue to Copenhagen as a port of call if the project was carried out, brought pressure to bear on the Duke of Lauenburg, through whose territories the canal must pass, to veto the work, and it was consequently given up. In 1525 a canal, navigable

however only for boats, was constructed, connecting Lübeck (which lies on the Trave) directly with Hamburg and the Elbe, through the Alster, which flows through the city into the last-named river; it was destroyed, however, some twenty-five years later in a local quarrel for its possession, and although since 1818 three proposals were made to reconstruct the Canal on the same route, nothing was done.

Without going into details of the various other projected canals, all of which are shown on Plate 24, it must suffice merely to notice the one known as the Eider, which, with the exception of the short-lived Stecknitz Canal, was the only one completed and in existence at the present time, although it has been partly incorporated in the new canal. Adolf Duke of Schleswig-Holstein-Gottorp, as far back as 1571, wrote to the Kaiser Maximilian II. proposing the carrying out of such a work, but two hundred years elapsed before it was commenced in 1778, under the auspices of Christian VII., King of Denmark, being finally opened for traffic in 1784. According to the original plans it was to be available for vessels of the largest size, but unexpected difficulties presented themselves in the course of construction, so that the depth of water has always been far less than was contemplated. It started from Holtenau, 3 miles to the north of Kiel, and by means of six locks rising to 23 feet above the level of the Baltic, ships could pass to the small town of Rendsburg, through a water-way 30 miles long (counting the lakes the canal traverses), 11 feet deep and 100 feet wide, with an almost square section, and then follow the Eider, 80 miles further down to Tönning on the Elbe, and so into the North Sea. The canal took a circuitous course, avoiding the greater obstacles. The lower Eider being tidal, navigation was easy at times, but the tortuous windings of the river and its small depth proved very awkward, especially with contrary winds, while an awkward bar and other banks off Tönning acted as too formidable an obstacle to any improvement of the canal. Yet more than 4,000 vessels passed yearly through it about the middle of this century, although in 1863 the number had sunk to 1,500; during the war of 1870 gun-boats and transports were pushed through. The length of the Eider Canal was 67·5 miles; it cost 9,044,750 marks, and nearly 3,000 men were employed in its construction.

After the conclusion of the war between Germany and Denmark in 1864, the Prussian Government commissioned Herr Lentze to make the necessary surveys for a ship canal to join the Baltic to the mouth of the Elbe. Lentze proposed the line St. Margarethen-Rendsburg-Eckernförde or Kiel, a level cutting with one lock at the Elbe entrance. Before actual operations could, however, be commenced, the war of 1866 broke out between Prussia and Austria, followed by the Franco-German war of 1870-71. In 1878, Herr Dahlström, of Hamburg, undertook a survey on his own account, in which he was assisted by a Herr Boden. Their reports were examined and approved by Herr Baensch on behalf of the Prussian Government, with the result that the modified Lentze-Dahlström project, and the careful inquiry into the commercial outlook made by these gentlemen, formed the basis of the Bill submitted to the Reichstag, which it passed in May, 1886. The argument that the largest ironclads could steam from the Baltic to the North Sea within less than 24 hours carried great weight. The dread of further fortifications may also have entered into some minds. But it does not appear that special fortifications of the canal are contemplated. Each of the double locks is now being encircled by a palisade wall, of questionable strategical value, just to prevent a surprise visit. The splendid harbour of Kiel, which has a first-class anchoring ground, at a depth of between 30 feet and 50 feet, of 6 miles length and 1¼ miles width in its inner part, and fine accommodation in the outer bay, is amply fortified. The marine workshops, imperial wharves, with their great docks, the marine stores, the Admiralty, the torpedo harbour, and the commercial wharves of Gaarden, Ellerbeck, and Neumühlers are all within a distance of 3 miles from the mouth of the canal. Neither is the western entrance itself



W. J. Kelliher & Co. Litho. London

fortified, the fortifications at Cuxhaven at the mouth of the Elbe affording sufficient protection. There is the natural protection of sand and winding channels, with their dangers to friend and foe. The situation acquires strength, moreover, from the nearness of Heligoland. This may not be very obvious to anyone looking simply at the continental outlines, but a glance at the chart will show that any vessel coming from Wilhelmshaven, the naval port on the Jade Bay, now somewhat jealous of Kiel, has to approach Heligoland to within 23 miles to find deep water. If it should hail from the west, it would come still closer to the guns on that little island, which is only 17 miles from the mouth of the Elbe. Entering then the estuary of the Elbe, the vessel would have to brave the guns at Cuxhaven long before getting in sight of Brunsbüttel. That the situation affords a strong basis for naval operations, was proved during the Franco-German War, to the detriment of the Germans, whose vessels were kept in check by the superior fleet of the French grouped south of Heligoland. One more point respecting the strategical aspect. An attacking fleet might advance through the Sound and the Belts. Of these passages, however, deep draught men-of-war will decidedly prefer the Great Belt, as the Sound, and still more so the Little Belt, are somewhat shallow in parts. Any vessel issuing from the Great Belt would, however, expose itself to an attack directed from Kiel.

Dahlström first attempted to form a company for the construction of the canal with State aid, but he failed, and the Government, having become convinced of the great advantages of the scheme, both military and economical, took over the project as a work of public utility, and proceeded with some modifications to definitely carry it out. An imperial rescript to the Chancellor Bismarck cut short every delay, and the difficulties, both financial and technical, vanished one after the other as if by enchantment.

The estimated cost, 156 million marks, equal to 195 million francs, has been maintained in spite of some variations rendered necessary in the course of the work. In consideration of the military importance of the canal on the 16th March, 1886, by the vote of the Reichstag, the sum of 50 million marks was provided, and the same sum by the Prussian Chamber on the 16th July of the same year. On the 17th of July an imperial committee was formed to inaugurate and carry out the work of construction. As regards the rest of the necessary capital, by the same vote above quoted the Government was authorised to issue a loan for the amount, the payment of the interest on it being considered sufficiently secured by the traffic. The committee, under the Minister for Internal Affairs, is composed of four members, viz. : Lowe, Councillor of State for the Kingdom of Prussia, president ; Fulscher, Civil Councillor of Prussia, co-director ; Koch, Civil Councillor of Würtemburg, second technical commissioner ; Wenneker, Councillor of State, accounts department. There are also at the disposal of the committee two bureaux, the one eminently technical, directed by the inspectors of works, Seeliger and Greve ; the other legal, directed by the assessor, Starke.

At 10 a.m., on the 3rd June, 1887, the laying of the foundation stone of the great lock at the Baltic end of the canal was performed by the late Kaiser William with great pomp and ceremony, who accompanied his three final taps with the hammer with the following dedication words :—

"To the Glory of United Germany,
To its growing Prosperity,
As a token of its Power and Strength."

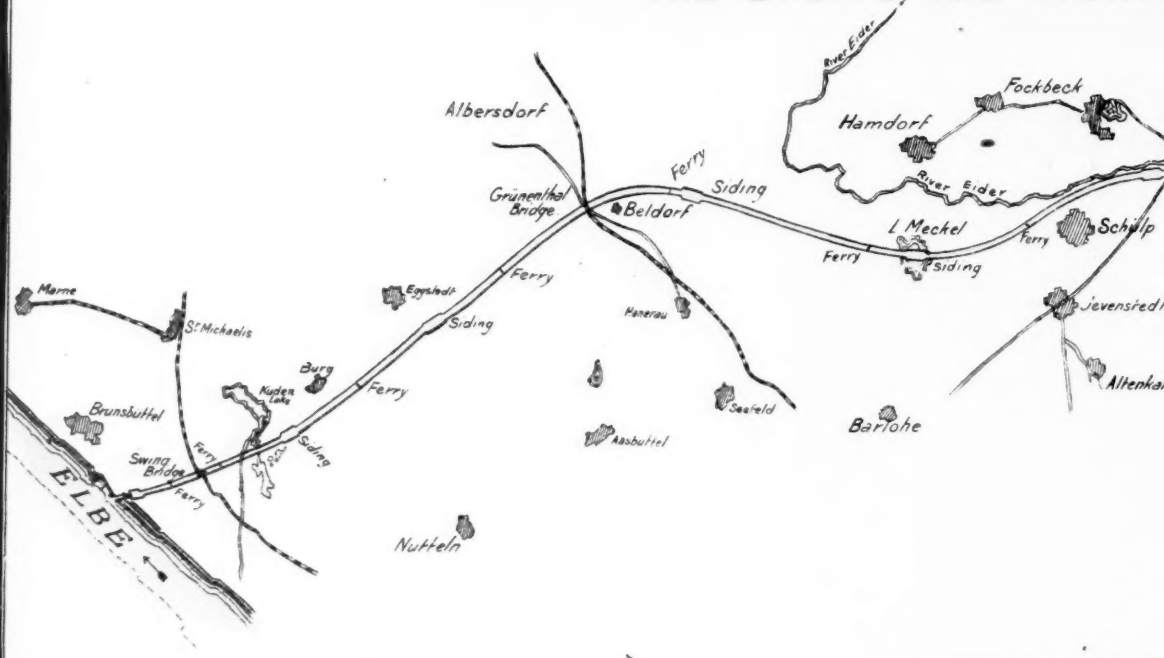
The canal may be called level, although it is provided with locks at the two extremities. It has a length of 98·65 kilometres, and traverses a relatively flat region, if we except some small hills with a maximum altitude varying from 23·7 metres (30 kilometres from the Elbe) to 21·8 (at 92 kilometres) above the normal level. The bottom is level for 38 kilometres, that is from Kiel to Rendsburg, and then descends at an easy but increasing gradient towards the Elbe, embouching into the waters of the upper Eider. The depth is never less than

9 metres, and as that of the original project was 8·50 metres the amount of earth requiring to be removed was increased from 63 to 78 millions of cubic metres.

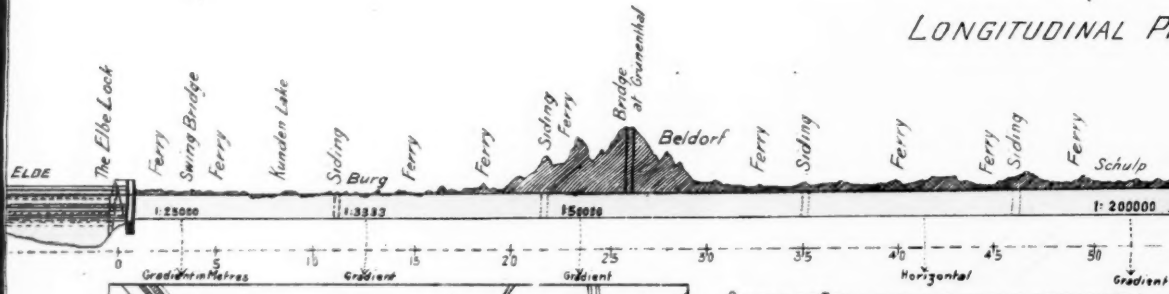
On the other hand, for a considerable length of the canal, where it runs through the low plains of the Elbe, especially in the marshes between Burg and the Kudensee, the banks had to be artificially raised by means of parallel dykes of a minimum height of 2·23 metres above the water level, and at other parts of the plans the lakes of Kuden, Meckel (dry), Audorf, Die Enge, Schirnau, and part of the Flemhudersee had to be utilised, as shown in the plan we give in Plate 25. An interesting feature in the cutting of the canal was that connected with the Flemhuder Lake, a stretch of water some 578 acres in extent, and forming another of the series of lakes through which the Upper Eider passes before reaching Rendsburg. The level of this lake was 23 feet higher than that of the new canal and to have so extensive a collection of water as this, and one, too, nearly 100 feet deep in parts, quite close to the new canal—into which the Eider, flowing from the lake, would still have to find an outlet—was, of course, altogether undesirable. Hence the water of the lake was made to run off into the canal until equality was established between the two, an opening then being cut in the canal banks wide enough to allow of a vessel passing direct from the canal to any part of the lake. The immediate result of this partial drainage of the lake was that large tracts of land were laid dry, though in order not to interfere unduly with the water supply of the locality a ring canal was made, by means of dams, around what were formerly the extreme limits of the lake, and hence on the same level. The Eider itself still flows into the Flemhuder Lake on the south side, but it now has a fall of 23 feet, and it is of some importance in the efficient working of the canal, as its waters will help to maintain a steady current from east to west, decreasing the possibility of the canal's being frozen over in winter, and increasing the volume of water which, flowing straight through the Brunsbüttel locks at ebb tide, is to help in keeping the North Sea entrance clear of obstruction.

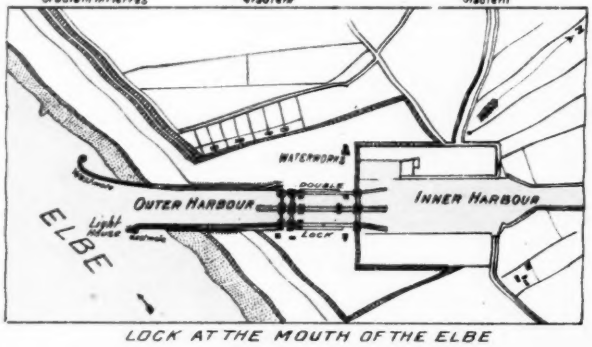
The only other special feature of the engineering work which need be mentioned here was the trouble involved in cutting through some particularly marshy land around the Kuden Lake near to Brunsbüttel and the Meckel Lake, to the west of Rendsburg. Here light bridges were first built, little by little, in parallel lines across the bog, and along them were pushed small wagons containing sand, which was thrown down on the bog in such a way that the supports of the bridge were gradually covered by it. Then larger wagons of sand were sent along, and so in course of time a solid mass was obtained, the sand either pressing into the bog by its own weight or being worked in by the men employed. In this way a firm double dam was eventually formed, capable of resisting both the pressure of the canal water on the one side and of possible inundations on the other. Then the intervening space between the parallel dams was dug out to the required depth, and a firm foundation for the canal, with its sides of stone and cement, eventually secured. With the exception of these stretches of bog land the course of the canal mostly passes through sandy or clayey soil, and, though no blasting operations were necessary, a good deal of the sand was of so loose a character that much trouble resulted at times from landslips, and special precautions were necessary for strengthening the sides of the canal in those parts where the soil is of this description. The width at the bottom is 22 metres, and at the water level about 65 metres, and with the inclination of the banks a depth of not less than 6·30 metres for a width of 40 metres is provided. The banks themselves are formed of the soft earth, covered at the water line by stone facing over a surface of 1,232,000 square metres. The cross section of the canal from the bottom to the water line has an area of 411 square metres. Although not so straight as the Suez Canal, the North Sea and Baltic Canal is in a direct line for two-thirds of its total length, the remaining third consisting of curves. There are in all twenty-seven curves, and the width of the canal in them is suitably increased for safety in navigation: the narrowest are four of 1,000 metres radius; the widest, three of 6,000

THE BALTIC, AND NORTH



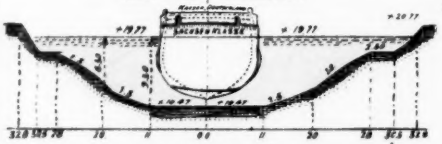
LONGITUDINAL P



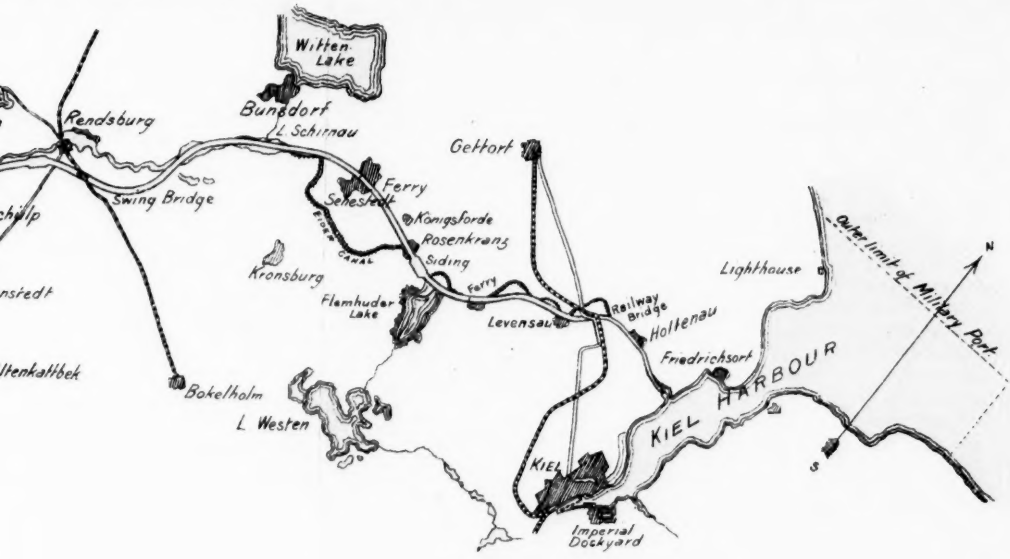


LOCK AT THE MOUTH OF THE ELBE

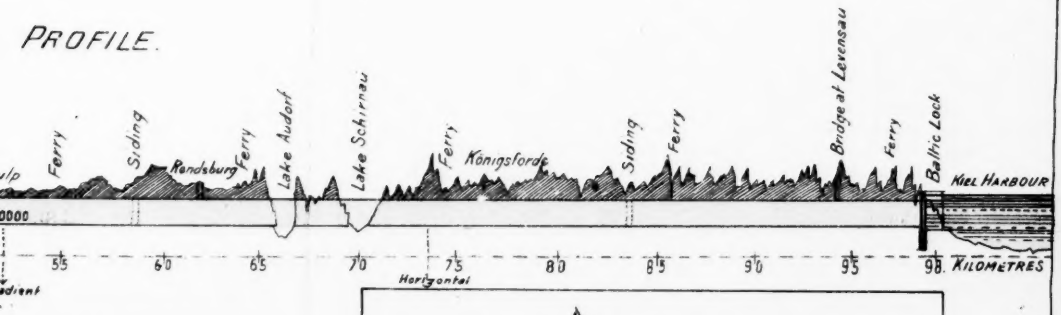
PROFILE OF CANAL SHEWING MIDSHIP-SECTION OF DIFFERENT CLASSES OF GERMAN BATTLE-SHIPS IN CENTRE OF WATERWAY



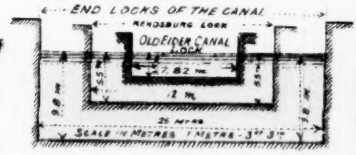
RTH SEA CANAL.

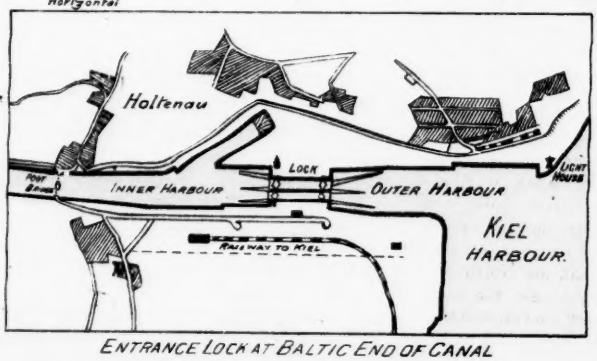


PROFILE.



PROFILE OF THE LOCKS.





ENTRANCE LOCK AT BALTIC END OF CANAL

metres radius in the Elbe marshes. The crossing stations are very fine ; they have the form of roomy basins extending for 450 metres, with an ample water surface 60 metres in width and a normal depth of 9 metres, so that battle-ships of 10,000 tons might pass each other without stopping. There are six of such stations. Besides these, in order to preserve the communications between the opposite banks, there are ferries at different points in communication with the country roads, whilst the communications of the principal railways and main roads are maintained by swing bridges, as for the Rendsburg railway, or by higher structures. Of the latter, one called the Grünenthal serves for the West Holstein railway, the other near Levensau serves for the railway between Kiel and Eckernförde.

The Grünenthal Bridge has been finished and used for railway traffic since 1st November, 1892, and up to that time 52 million tons of earth (chalk and rock excavated) had been removed, and 116 million marks expended.

The Levensau Bridge (Plate 26) merits especial mention. In the first design a swing bridge was in contemplation for the railway, and a transport ferry for the high road from Kiel to Eckernförde. In consideration that this traffic is continually increasing, and that it would not do to interpose many obstacles to the free passage of the canal, it was very soon decided to adopt a fixed bridge of great height. This bridge, designed by the Herrn Lauter and Muthesius, is in fact an imposing work of engineering, superior in every respect to the Grünenthal Bridge. For its span it is the widest bridge in Germany. The following dimensions will show the difference between the two :—

DIMENSIONS OF BRIDGES.

Dimensions.	Grünenthal.	Levensau.
Height above the water level	137 feet 9 inches	137 feet 9 inches
Span	512 feet 6 inches	536 feet
Height of banks	65 feet 6 inches	62 feet
Width of canal at bottom	72 feet	141 feet
Width of canal at water line	196 feet 6 inches	285 feet

The Levensau Bridge crosses the canal at a very wide part, principally because it follows here one of the sharpest curves of its route (a radius of 1,000 metres), and is widened, in consequence, for the whole curve to 36 metres, and to 43 metres in the neighbourhood of the bridge. The bridge in turn provides a free passage for a ship 137 feet in height for a good 161 feet of its own length, so that full-rigged ships can pass underneath without obstruction or delay, with only the striking of their top-gallant masts, there being a clear space between the surface of canal and the bridge of 137 feet 9 inches. It weighs in metal alone 2,800 tons, and, in addition to the ordinary statical conditions, is designed to support a wind pressure of 150 kilos. to the square metre loaded, and 250 kilos. to the square metre unloaded. On the eastern side of the bridge is a double railway track, and on the other side a carriage road and footpath for foot passengers. The preliminary work commenced in the autumn of 1892, and fifteen months after the work was completed the grand bridge of Levensau was formally opened to traffic in the presence of the Emperor on the 3rd December, 1894. This work increased the expenditure by 4,060,000 marks. The Grünenthal Bridge was constructed between the months of March, 1891, and August, 1892, from the designs of Inspector Greve, assisted by others.

The two other railways, the Neumünster-Rendsburg line at Rendsburg, and the Itzehoe-Heide line, near to Brunsbüttel, are carried across the canal by means of swing bridges, the pivots of which are on the embankment of the canal, while each line has two separate bridges, carrying a single set of

rails, so that in case of the one bridge becoming unworkable for a time the traffic could still be carried on by means of the other. There is, too, at Rendsburg still a third swing bridge for the purposes of ordinary traffic. These bridges are said to be the largest of their kind yet constructed, their length being 326 feet, while they stretch across a clear breadth of 164 feet of water. Yet, notwithstanding their massive proportions, they can be turned completely round, by means of hydraulic power, so as to leave a clear course for high-masted vessels, within so short a space of time as two minutes. The railway swing bridges will be in position only when the trains are expected, remaining at other times parallel with the canal, though the bridge for pedestrians and vehicles will remain in position, being drawn aside only when necessary for the passing of vessels along the canal.

To the north of Rendsburg, the railway crosses still another bridge at a point close to where locks have been provided for the purpose of maintaining communication between the North Sea and Baltic and Canal and the Eider River. Just to the east of Rendsburg there is a succession of small lakes, formed by the Upper Eider, and constituting part of the old Eider Canal. The new canal is diverted to the south-west at the Audorfer Lake, and passes to the south of Rendsburg; but the old waterway for the short distance from the lakes to the Lower Eider is to be maintained as well, in the interests of vessels proceeding to the river from this point, instead of continuing along the ship canal. In this way any interference whatever with the old Eider Canal traffic will be avoided, and vessels will be able to proceed along the river Eider to Tönning as before. But these arrangements rendered necessary a series of important works on the north side of Rendsburg. In the first place, the water level to the Upper Eider, and hence of the lakes referred to, had to be reduced to the same level as that of the ship canal, which was here to be incorporated with it. The reduction of the water level made still more necessary than before the deepening of the channel leading from the lakes to the Lower Eider, and this involved the building of a new railway bridge, which here, also, is a "swing" one, though in this instance the bridge rests on a central pivot built in the middle of the stream, and not on one of the banks, the vessels passing on either side. Now locks, much more commodious than those previously existing at Rendsburg, have also been provided to facilitate the passing from the different levels of river and canal, so that altogether the work carried out at Rendsburg has been of considerable importance.

The roads which the canal has intersected have been replaced by 14 flat-bottomed wire-rope ferries, about 4½ miles apart. In the interest of these ferries, a higher speed than the 5·3 knots of the regulations would be objectionable. The ferry near Holtenau differs from the others. Here two floating stages, resting on boats, bridge the canal, turning in opposite directions, that is to say, each towards the right for any one standing on either shore. Very often it is sufficient to turn one of the stages, thus clearing half the width of the canal. A few weeks ago the turning was still done by hand; but petroleum motors of 8-H.P. are being put up. This type of ferry bridge has become so popular that more will probably be arranged on the same plan.

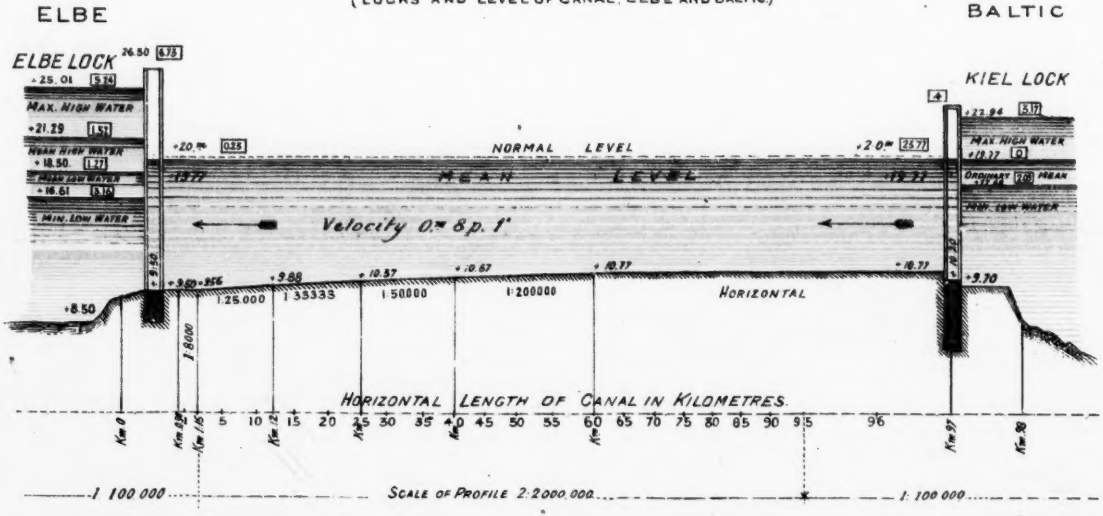
Perhaps in the work of construction the most interesting feature is to be found in the great terminal locks (Plate 25), and of these the locks at Brunsbüttel claim first consideration. They are protected from the current of the river by two moles, the heads of which are 1,274 feet apart, thus allowing a good space for entrance into the outer harbour, which has a breadth of 328 feet and a length of 1,312 feet. Here the vessels that may have to wait their turn before passing through the river will be accommodated. The locks themselves are double, the one set lying parallel with the other, divided by some massive masonry, under which are several tunnels for the hydraulic machinery to be used for opening or closing the gates, and other purposes. The width of each lock is 82 feet, the depth 30 feet, and the available length, when the gates are closed at each end, is

C. J. KELLNER & Co. Little London

Journal Royal Institution Vol XXXIX

NORTH SEA AND BALTIC CANAL.

(LOCKS AND LEVEL OF CANAL, ELBE AND BALTIC)



LEVENSAU BRIDGE

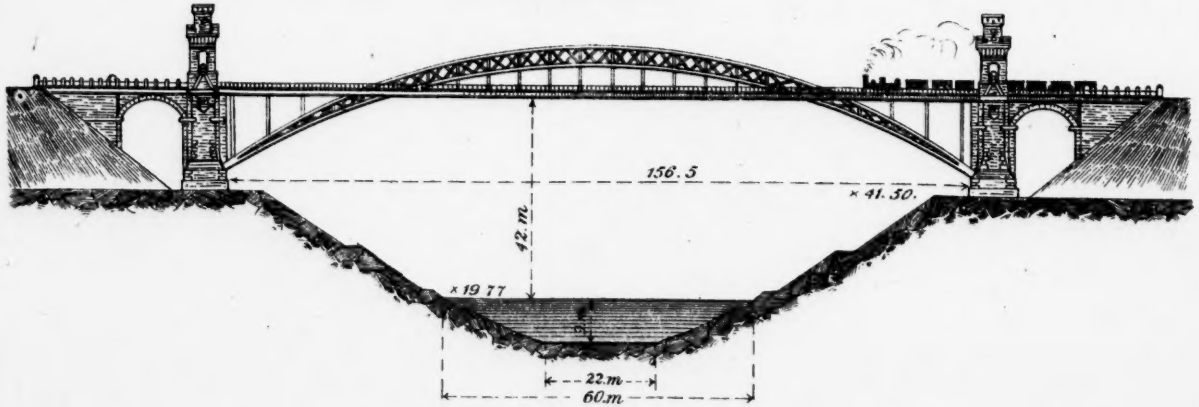


Plate 26

492 feet—dimensions adequate to allow of the passing through the locks, at any state of the tide, of the largest ironclads now possessed by Germany, while vessels the length of which exceeds that of the locks, will still be able to pass through them during those hours of the day when the gates are all open. It is estimated, however, that four steamers or nine sailing ships of ordinary measurements can find room in each set of locks at one time, so that the period of detention ought not to be very great. On leaving the locks a ship coming from the Elbe will enter the inner harbour, which has a length of 1,640 feet, and a breadth of 656 feet. Here the vessels from the Baltic will await their turn to enter the locks, and here, too, there will be a coaling-station, accommodation for men-of-war, and a small harbour on the northern side for vessels used in connection with the working and maintenance of the canal. Outside the inner harbour the waterway tapers off to its normal dimensions.

The locks at Holtenau are similar to those at Brunsbüttel, though the outer and inner harbours vary in their dimensions, and the work generally has not presented so many difficulties as that done at the other end. It was carried on mainly in the dry, and the tidal fluctuations of a powerful stream like the Elbe had not to be provided against. Thus the cost of the Brunsbüttel harbour and locks is put down at £771,750, as against £660,000 for those at Holtenau. The two large moles, extending into the waters of the Elbe, are covered with basalt from the Eiffel Mountains, and terminate in two large iron lanterns. On a suitable site a Pegel tower of 15 metres has been constructed, which serves to show at a distance the water level in the Elbe, as well as in the locks and in the canal itself. There is also a similar tower at Holtenau. In Plate 26 is shown, on an exaggerated scale, the general profile of the canal, with all the data of the heights above the horizontal ("Kanal-Null"). The object of this plan, compiled from the official information, is to show not only the profile of the bottom, but also and more particularly the variations in the water-level in the Elbe and Baltic, with regard to the mean level in the canal, from which arises the necessity for the end locks. It should be noticed also, that both by the junction of the waters of the upper Eider with the canal, and the low waters at the mouth of the Elbe, the water of the canal will be kept in motion continually from east to west at a velocity of ·8 metre per second, so that ships passing from the Elbe to the Baltic will have a current of a knot and a half against them, and the same in their favour on their return trip.

Subjoined, for comparison, are the dimensions of the locks of the new canal and of the old Eider Canal, including the new junction lock at Rendsburg. (Plate 25.)

DIMENSIONS OF THE LOCKS.

Dimensions.	End locks of the sea canal at Brunsbüttel and Holtenau.	Transit lock at Rendsburg between the sea canal and the lower Eider.	Lock of the old Eider Canal between Rendsburg and Holtenau.
Length ... ... feet	492	223	105
Width ... ... ,,	82	39	26
Depth at water level ... ... ,,	29·9	17·3	10·6
Area of water surface ... sq. metres	3,750	716	250·24
Area of cross section ... ... ,, ,,	245	66	27·37
Capacity .. .. cub. metres	36,750	3,988	875·84
IN RELATION TO THE EIDER LOCKS.			
Area of water surface ... sq. metres	14·98 : 1	2·86 : 1	1
Area of cross section ... ... ,, ,,	8·95 : 1	2·41 : 1	1
Capacity ... ... cub. metres	41·95 : 1	4·49 : 1	1

The largest lock of the Manchester Canal, at Eastham, is 590 feet long, but only 78 feet 6 inches wide, and the depth does not exceed 26 feet.

There is one very important fact to be noticed, which is that whilst the depth of the canal has been carried to 29 feet 9 inches, and at the mouth of the Elbe at ordinary low tide to 32 and 42 feet, the bottom rises rapidly towards the left bank at the neck of the Oste Riffe, where the average depth is only 23 or 26 feet. This is certainly a great drawback to the efficiency of the canal, since ships of larger draught must wait for high tide to pass this arm of the sea, a distance of three miles. This inconvenience, however, is common to all ships bound for Hamburg.

On the other hand, it is necessary to observe that the traffic of the canal will involve a movement effectively greater than that of the Suez Canal. If expectations are verified the movement at the present time will consist of about 20,000 ships, or 8,000,000 tons, which gives a mean of 400 tons for each ship. The Suez Canal was used up to the end of 1894 for a total tonnage of 7,047,000, the average tonnage per ship being 2,038, which reduces the number of ships to 3,347.

From this it is easy to argue that the Baltic and North Sea Canal will be much more crowded with shipping in proportion than is the Suez Canal, and so as to make it necessary that it should be kept free for traffic at all hours and in all weathers. For this reason the Baltic Canal, unique in its kind, will be illuminated by the electric light by means of powerful lamps along its banks; as we have already shown, however, the capacity of the canal is sufficient to clear a much larger number of ships than the anticipated requirements. The whole of the electric installation, which is the largest of its kind, has been entrusted to the "Helios" Company of Cologne. The machinery comprises two sections, one at Brunsbüttel, the other at Holtenau, and the current is led along the two banks; poles 240 to 250 metres apart, and 4 metres high, are furnished with incandescent lamps of 25-candle-power each; 884 lamps in all.

Besides these there are sixty-eight larger lamps for the illumination of the four railway bridges, and the thirteen transport stations or ferries. Each of the locks is illuminated by twelve lamps. The lamps at the entrances have particular colours, and where the canal crosses the lakes, which occurs at two points, for distances of 1,200 and 5,800 metres respectively, buoys illuminated by gas are laid down to show the channel is free.

The military importance of the canal to Germany is so self-evident that it is hardly necessary to dwell upon it. As the largest battle-ships in the German Navy will be able to pass easily through in the event of war, the Naval Authorities will be in a position to concentrate, without difficulty or danger, the bulk of their fleet either at Wilhelmshaven or Kiel, as the case may be. From its position on the North Sea, the importance of Wilhelmshaven as a base for offensive operations against a hostile fleet coming from the west is much increased, and the German Navy will be enabled on the outbreak of war to take the offensive with a powerful force, and to make a fight for the command of the sea from Skagen to the entrance of the English Channel; in any case, the fleet will at least be able to endanger the line of communication of an enemy trying to force his way into the Baltic, and consequently to seriously embarrass, if not to completely frustrate, his operations. The advantageous position, which Germany will now undoubtedly hold in the event of a naval war, will be due solely to the completion of the new canal.

As regards the commercial aspects of the new canal, the magnitude of the traffic between the North Sea and the Baltic is much larger than is generally supposed, while it is certainly steadily increasing. This traffic represents an annual registered tonnage of 12,240,000 for the years 1871 to 1880, and of 16,515,504 registered tons for the years 1887 to 1889, the total for the present year being estimated at 18,521,212. In the number of ships there is an actual falling off, the average for the years 1887-89 being 32,538, as compared with 36,423 for the years 1880-82; but taken by themselves, these figures are misleading, the tendency being, in respect to the Baltic traffic, for the vessels

Chart shewing the Traffic from the Channel and English Ports into the Baltic.
NORTH SEA
THE BALTIC
SWEDEN
NORWAY
DENMARK
GERMANY
HOLLAND
BELGIUM
FRANCE
Aberdeen
Dundee
Newcastle
Hull
London
Cristiana
Stockholm
Gulf
Libau
Memel
Königsberg
Dantzig
Copenhagen
Torpe
Rügen
Stettin
Berlin
Magdeburg
Hamburg
Lub
Strisa
Kiel
Flens
Aarhuus
Skaw
Bremen
Hannover
Wilhelmshaven
Emden
Dortmund
Cologne
Amsterdam
Leyden
Utrecht
Rotterdam
Antwerp
107
84
181
239
283
323
423
237
239

employed to increase considerably in size, while decreasing in number. Hence the real magnitude of the traffic must be judged not by the number of vessels, but by the amount of the registered tonnage. As showing the nature of this traffic, Herr August Sartori, president of the Kiel Chamber of Commerce, and one of the leading authorities in Germany on shipping affairs, has ascertained tha durin the month of October, 1891, no fewer than 2,199 vessels, of 1,557,709 registere tonnage, passed between the two seas, their destination or point of epartu being as follows:—Elbe ports, 128 vessels, 49,715, registered tons; Weser 92 vessels, 24,184 registered tons; Ems ports, 23 vessels, 5,723 registered ons Amsterdam, 84 vessels, 55,148 registered tons; Rotterdam, 80 vessels, 61,73 registered tons; Belgium, 81 vessels, 65,119 registered tons; English Channel and beyond, 471 vessels, 402,657 registered tons; London, 237 vessels, 192,813 registered tons; Grimsby, 97 vessels, 61,126 registered tons; Hull, 195 vessels, 172,867 registered tons; West Hartlepool, 111 vessels, 72,246 registered tons; Newcastle-on-Tyne, 220 vessels, 162,059 registered tons; East Scotland, 359 vessels, 217,114 registered tons; West Scotland, 21 vessels, 15,205 registered tons. The shortening of the voyage from various ports to a certain point in the Baltic, by means of the new canal route, has been calculated as follows:—

To the Baltic from	Viâ North Sea Baltic Canal.	Viâ Skager-Rack.	Savings in Nautical Miles.	Approximate gain in hours.
	Nautical miles	N. miles		
Hamburg	221·2	646	424·8	45
Bremerhaven	272·2	595	322·8	32
Emden	346·2	629	282·8	28
Amsterdam	450·2	687	236·8	22
Rotterdam	479·2	716	236·8	22
Antwerp	540·2	777	236·8	22
Dunkirk	561·2	800	238·8	22
London	591·2	830	238·8	22
Hull	536·2	717	180·8	15
Hartlepool	571·2	692	120·8	8
Newcastle	591·2	698	106·8	6
Leith	646·2	730	83·8	3

In the case of West Hartlepool, Newcastle-on-Tyne, and the Scotch and Norwegian ports, it would not be worth while to adopt the new route; but, leaving these out of consideration, Herr Sartori shows that the traffic for October, 1891, which might with advantage have passed through the ship canal is represented by 1,488 ships, with a registered tonnage of 1,091,085, out of a grand total of 2,199 ships and 1,557,709 registered tonnage; while out of the estimated total of 18,521,512 registered tonnage of traffic for the present year, the presumptive amount which comes into calculation in respect to the new canal is put down at 11,700,000.

Taking the "regular steamboat traffic" between the North Sea and the Baltic, Herr Sartori finds that the steamers of this class which may be expected to make use of the canal represent a registered tonnage per month as follows:—

				Reg. Tons.
Between Hamburg	and 12	Baltic ports	... ...	41,600
Do. Bremen	,, 4	,,	... ...	5,300
Do. Leer	,, 2	,,	... ...	900
Do. Amsterdam	,, 8	,,	... ...	14,000
Do. Rotterdam	,, 3	,,	... ...	6,100
Do. Belgium	,, 10	,,	... ...	23,500
Do. English Channel, &c.	,, 8	,,	... ...	70,400
Do. London	,, 9	,,	... ...	31,500
Do. Grimsby and Hull	,, 12	,,	... ...	64,500
Total	68	,,	... ...	257,800

As against these the registered tonnage per month of the regular steamboats which are not expected to make use of the canal is :—

					Reg. Tons.
Between Newcastle	and	8	Baltic ports	... ...	15,800
Do. East Scotland	,,	8	,,	... ...	29,300
Do. West Scotland	,,	1	,,	... ...	2,500
Total		17	,,	... ...	47,600

These calculations naturally put the matter in the most favourable light possible for the canal, and time alone can show whether so large a divergence of traffic is likely to occur.

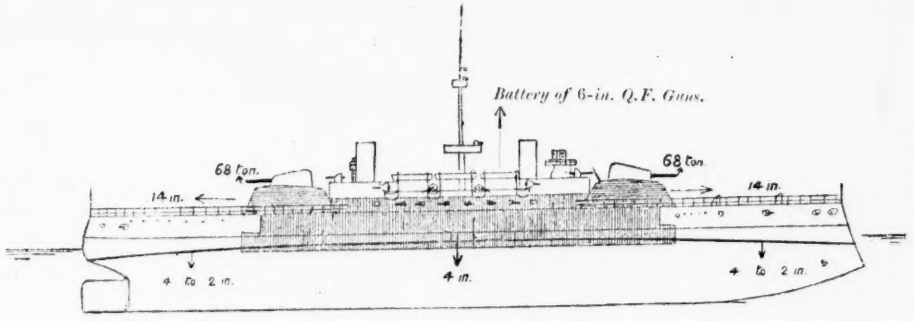
ITALY.—The following are the principal promotions and appointments, which have been made: Captain—C. Candiani to be Rear-Admiral. Admiral—H.R.H. Duke Thomas of Savoy to hoist his flag in "Savoia," in command of Squadron on Special Service. Rear-Admirals—A. F. Cobianchi for service at Ministry of Marine; C. Candiani to Director-General of the Arsenal of the First Maritime Department (Spezia), *vice* E. Gualterio.—*Gazzetta Officiale.*

Admiral H.R.H. the Duke of Genoa has hoisted his flag on board the Royal yacht "Savoia," and proceeded in her to Kiel, instead of on board one of the battle-ships of the fleet sent to be present at the opening ceremony, as was at first announced.

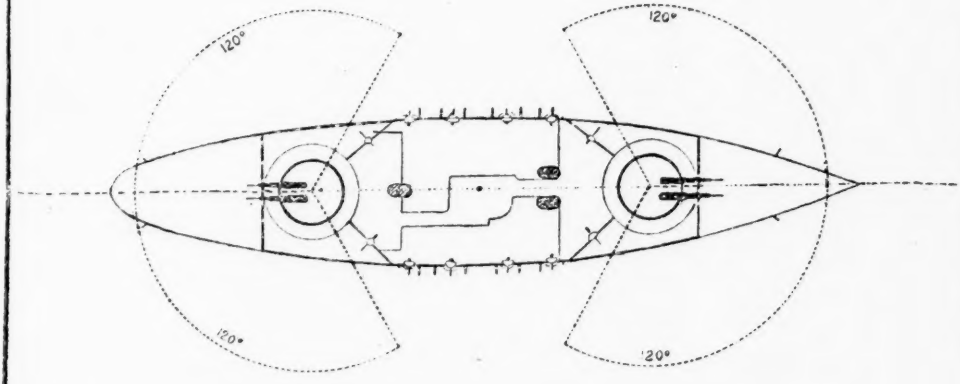
The frontispiece this month is the first class battle-ship "Re Umberto," which flies the flag of Vice-Admiral Accinni, the Commander-in-Chief of the Active Squadron. She is a magnificent ship, and as she will undoubtedly attract great attention when the Italian Fleet visits Portsmouth on its homeward voyage from the Baltic, the following details of her may be of interest. Like others of the modern battle-ships built for the Italian Navy, the ship was designed by M. Brin; and although the armour protection, except on the barbettes, is light—in fact, so light that in the opinion of many experts she and her two sisters, the "Sicilia" and "Sardegna," ought rather to be classed as armoured cruisers—yet her high speed and powerful armament combine to make her a formidable ship of war. Her dimensions are as follows :—

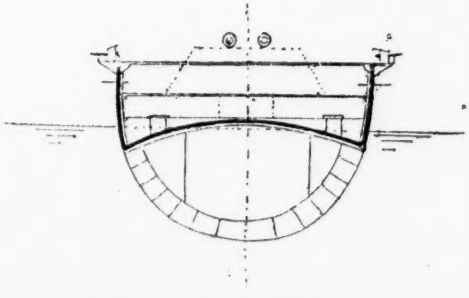
Length between perpendiculars	396 feet 6 inches.
Length extreme	416 ,, 4 ,,
Beam	76 ,, 9 ,,
Mean draught	28 ,, 6 ,,
Displacement	13,825 tons.
I.H.P.	19,500 ,,

The hull is of steel; the double-bottom is divided into 144 compartments, each of which has a mean volume of 66 square feet, with a height of 4 feet. The armoured deck which runs the whole length of the ship varies in thickness from 2 inches to 4·2 inches, the crown of the deck amidships is 4 feet above the water-line, and the deck then arches downward until it joins at the ship's side the top of the double bottom; it is formed of 356 plates, which have a total surface of 4,875 square feet, and represent a weight of 900 tons; above the armoured deck an immense cellular caisson runs both sides fore and aft, divided into 120 smaller compartments, each with a volume of 80 square feet and a height of 4 feet 9 inches. The side is protected with 4-inch steel armour for a length of 255 feet, which extends from 3 feet 3 inches below the water-line up to the deck of the superstructure, the weight of this armour is 780 tons and it covers a surface of 3,250 square feet; the fore and after ends of this casemate are closed by armoured athwartship bulkheads 2·8 thick, which reach to the upper deck. At each end, but within the casemate, rise the two barbettes for the heavy guns, which are protected above the upper deck by 14-inch armour, representing a weight of 655 tons, and covering a surface of 845 square feet.



PROFILE AND DECK PLAN
OF
ITALIAN FIRST-CLASS BATTLESHIP, **"RE UMBERTO."**





MIDSHIPS SECTION.

The armour on the lower slopes of the barbettes, the conning towers, ammunition tubes, etc., is 12 inches in thickness, and represent a further weight of 346 tons, the whole system of defence being completed by the armouring of the combings of the hatchways and funnels, etc. The armament consists of four 13·5-inch 68-ton guns, two being carried in each barbette; the armour-piercing projectile weighs 1,250 lbs., the initial velocity being 2,015 feet, with the power of piercing a 30-inch iron plate at the muzzle; the axis of the barbette guns is 32 feet 6 inches above the water line, while they have an arc of training of 2,40°; eight rounds can be fired in ten minutes, and the range of the guns is something over 9,300 yards. The auxiliary armament consists of eight 6-inch Q.F. guns, mounted on the superstructure behind shields, four each side; sixteen 4-inch Q.F. guns, six of which are mounted each side on the upper deck inside the armoured case-mate, while two are mounted at each end of the superstructure as chase guns, while fifteen 57-millimetre Nordenfeldt guns are distributed over different parts of the ship; there are, moreover, five torpedo-discharges, for the 18-inch Whitehead, four below water, two each side, and one stern tube.

The engines are of the usual modern type, developing 15,200-I.H.P. under natural and 19,500-I.H.P. under forced draught, which gives the ship the exceptionally high speed for a battle-ship of 19·3 knots, or a knot in excess of the fastest vessel of the "Royal Sovereign" class.

There are eighteen cylindrical return-tube boilers, having a diameter of 14 feet; in six separate compartments, four of which are placed before the engines and two abaft; the seventy-two furnaces and the 7,384 tubes have a grate surface of 440 square feet, and a heating surface of over 12,000 square feet respectively.

There are something over 45 miles of tubes in the ship, out of which the boiler and condenser tubes would cover 28·5 miles. There are five dynamos of 300 ampères and 65 volts each, which supply the current for 750 incandescent lights of 12-candle-power each, eight search-lights, four ammunition hoists, and five motors for other puposes.

MILITARY.

HOME.—The report on the new system adopted for testing the tactical fitness of Majors for command and on its results during the year 1894 is of great interest, and should be read by officers of all ranks. Nothing could show more satisfactorily than the opinions (unsigned in the original) printed below how ready our officers are to meet the demands necessarily made on them in order to test their fitness for responsibility in the field.

"I am of opinion that we see, after the first year's trial, a proof that the recent order has been one of great benefit to the Service generally. Senior officers have certainly been induced to study their profession more seriously. They have read a good deal, and have done all in their power to prepare themselves for the test to which they have submitted.

"Although I hope that as time goes on these tests may become a greater and more serious reality, I am convinced that those we have held this summer have done a vast amount of positive good, and a still greater amount of good relatively. They show a determination on the part of our Army rulers to insist upon officers qualifying themselves for high position in the Army. This will make them study the art of war. I find the best possible spirit alike in all ranks on this point."

The syllabus of the subjects in which the Boards are to test Majors has been re-considered, and has been amended as follows:—

1. Finding his position in the field on a 1-inch map, and in identifying points, both distant and near.

2. Showing with coloured pencils, on a contoured map, the dispositions of a force consisting of one or two battalions, one battery (or a portion of one), and

one or two squadrons, in compliance with the conditions of a tactical problem. (The map used is not to be one of country adjacent to the place of examination.)

3. Indicating on a map the dispositions and writing the orders to commanders of units by the commanders of a force (which will be such as specified in 2) for the solution of two tactical problems. These problems will be set by the Board. Each will comprise some definite military operation of one or more named forces. (Time to be allowed, two hours.)

4. Handling in a tactical operation in the field a regiment, battalion, or battery, at the option of the officer.

5. Commanding in the field a force of all arms (as specified in 2) in any operation of minor tactics and issuing the necessary orders within half-an-hour of receiving a statement of the tactical problem to be solved.

THE MILITARY TOURNAMENT.

The work accomplished by the Committee of the Royal Military Tournament merits the warmest congratulations of all who are interested in the vital question of the efficiency of the Army. First and foremost in its claims to our gratitude, we should place the revival of a standard of smartness in drill—a standard, which some ten years or more ago, seemed to have become a thing of the past. The slackness of our men in handling their arms, their want of precision in the execution of manœuvres, in all branches of the Service, had become a positive danger to the country, for it indicated how completely the importance which attaches to the drill training of the men as a means towards the acquirement of true fighting discipline had been forgotten or ignored. Lest this should be misunderstood, we add a few words of explanation. *Steady drill* was introduced into all armies by practical men, because in an age of warfare, experience proved conclusively that the fighting power of the men, within the same limit of nationality, varied directly almost as the square of their steadiness under fire, and the only way to secure that steadiness was to train the soldier in such a manner that his will acquired full command over his muscles; in other words, so that his legs could not run away with him without the consent of his mind, and the mind was further withheld from giving this consent by a variety of other motives, which differed in their cogency in the several armies.

During a period of long-continued peace, broken at best only by conflict with relatively inferior races, the idea of drill as a practical means to a necessary end was gradually lost sight of, and as a consequence, in almost all armies, recent campaigns have shown a marked falling off in the capacity of the troops to endure punishment. The Germans were the first to trace this phenomenon to its proper source, and almost before the last guns of the 1870 campaign were fired they took the matter in hand with their usual thoroughness, and within a very few years they had achieved a perfection of steady drill hardly to be surpassed. All efforts, however, in this country to revive the same feeling failed for the moment, not for want of goodwill on the part of the men and junior officers, but chiefly for want of a proper standard available for all to show what was really required; and it is the special merit of these annual competitions that they have, by awaking a spirit of emulation between regiments, companies, batteries and squadrons, evolved a measure of the degree of steadiness and precision attainable, by which everyone can estimate the results of his own achievements.

The Aldershot Gymnastic Class this year have fairly beaten all previous records; it is almost impossible to imagine more perfect accuracy in all movements, and for this the credit must rightly be assigned to the carefully thought-out system of instruction, combined with the temper and tact shown by the instructors in the performance of their task, for it cannot too often be insisted on, that such excellence cannot be achieved by bullying or severity, but only by cordial co-operation on the part of all hands for the common aim.

Of course, in a sense the men are picked, but the severity of selection is by no means excessive, the only necessary qualification being 35 inches chest measurement and general physical soundness.

The value of the knowledge each class takes back to its regiments cannot, we believe, be overrated; in every regiment hereafter there will be at least some men who know the highest limit of excellence attainable, and the manner in which alone it is to be attained; and their example, their splendid physical development, with the credit universally awarded them, will act as the best possible stimulus to others to follow in the same path.

For the Historical Pageant, too—a new feature in this year's programme—all thanks are due. A more effective means of awaking interest in the deeds of our forerunners and their share in the making of history could hardly be suggested, and it is on these traditions that the maintenance of the best form of *esprit de corps* depends in peacetime. The idea is so good, and has proved itself so popular, that we venture to suggest a still further extension of it to reach those regiments too far from home to attend these special exhibitions. Nearly every regiment in the Service has some anniversary of its own, which is kept with all pomp and circumstance their situation can command. Why—to bring back the deeds of their military ancestors more vividly to the minds of their young successors—should not the trooping of the colours be held on that day with the men of the colour party in the uniform of the day they commemorate? In Germany it has long been the custom, on the occasion of the regimental jubilee, to parade a large part of the regiment in the uniforms of the successive periods of the regimental existence, but the jubilee comes round too seldom, and what is wanted is to awaken the interest of the young soldier while he is still with the flag.

As regards the horsemanship of the various bodies and individuals taking part in the display, it is impossible, unfortunately, to speak in the same terms of admiration; but, in saying this, we do not wish to be understood as censuring in any way either men or officers, whose pluck and goodwill were apparent in all things, it is only the consequence of the general neglect of all true equitation throughout the nation, a neglect primarily due, we believe, to the changed conditions of national existence brought about by the increased facilities for locomotion, which railways, and possibly bicycles, now afford us, and this is a factor that we can count on always having with us. Probably it does not hit the men as hard as the officers; for the latter now no longer require to train their own horses, but for the most part buy their hunters ready made, and provided they are carried tolerably straight and without too many falls, are reasonably satisfied, selling off their horses for polo ponies at the end of the hunting season, and buying new ones when the autumn comes round again; but this was not the custom fifty years ago.

A more serious, and exclusively military, difficulty with which we have to contend is a legacy from the old Napoleonic wars, and a consequence of the subsequent long peace. This paved the way, by steps, which we have already indicated in an article headed, "Decline and Revival of the Prussian Cavalry," in the January number of this JOURNAL, 1894, to the universal acceptance of the idea that the day of cavalry charges in "large bodies" were over, and reconnoitring and scouting the only field left open for its activity.

The British officer is nothing if not practical, but the trouble is that he is sometimes too practical; and in his devotion to the immediate object before him, forgets the consequences which must inevitably ensue from his own actions.

People forgot that if both sides go out to scout, collision must ensue, and that victory in that collision will remain to the side that delivers the charge in the best order. They reasoned that a man would see most who could get about individually anywhere across country; and since the average hunting man of 12 stone, on a valuable horse, in the pink of condition, could obviously traverse the country with greater facility than a troop horse on insufficient rations with 20 stone on

his back, that therefore the hunting school was the best one, and all that was required to make our cavalry perfect was short stirrups and a loose rein.

The consequence has been that the very idea of the unconditional obedience of the horse to the rider appears to have vanished, and that even picked bodies cannot work in sections with the same precision with which whole war strength troops and squadrons manœuvre both in Austria and Germany.

Mass cavalry manœuvres will in the end remove this trouble also. As the idea of the importance of the closed knee to knee charge revives, the common sense of our squadron leaders will soon perceive that the "unconditional" obedience of the horse to its rider lies at the root of the whole thing, and once this idea is realised the performances of the barebacked detachment shows that our men possess in the very highest degree the capacity to enforce it. We have just one word more to say on the question of "unconditional" obedience—a clumsy expression truly, but the only one that describes what we desire.

In the "rides" it was very evident that in many individual cases the horses occupied their relative positions one to the other because they had been trained so to do, and not because the individual will and skill of the rider placed them there. In fact, what we saw was "circus," not "military, riding," and the want of military riding was even more conspicuous in the mounted combats than even in the "rides."

Now the very essence of military riding is, that the horse obeys the aids of the rider, not because he has been coaxed into a habit of doing so, but because he is so collected in the hands, and between the legs of his rider, the weight so distributed on his points of support, that the application of the aid compels him to move in the required direction on pain of falling over in another if he tries to resent doing so. There is an idea somewhat widely disseminated among British riders, that the cavalry regulations are wrong where they seem to imply that the application of the several aids *compels* obedience on the part of the horse. They argue that they do nothing of the kind, but simply indicate to the trained animal what his rider requires of him, and the horse yields because he has been taught to do so. This error, we must confess, we shared for a long time; but since some years ago we were fortunate enough to enjoy the benefit of Mr. Fillis's instruction, we are compelled to confess that we were wrong. It was abundantly demonstrated to us that under the seat of a real master, obedience was *compulsory*, being the necessary consequence of the adjustment of the points of support to the altered position of the combined centre of gravity, due either to alteration of the incidence of the rider's weight, or that of the horse induced by the feel of the reins. There was no expenditure of brute force about it, simply the exercise of consummate skill. His book, "Principes de Dressage et d'Équitation," should be in every officer's hands.

We do not anticipate that the day will ever come when the worst of our recruits will be up to the standard of Mr. Fillis, but we do venture to predict that in proportion as the ideas on which he works become common knowledge to our officers engaged in teaching themselves, or training their squadrons, a very marked improvement in our horsemanship will certainly take place.

MILITARY PICTURES AT THE ACADEMY.

Last year we protested against the gross historical inaccuracy of a picture entitled "The Hollow Road of Ohain," in which French cavalry were depicted emulating the swine in the country of the Gadarenes, by rushing violently down a steep place and perishing in the abyss. This year, though there is no glaring absurdity to indicate, there is, nevertheless, a picture of "Waterloo," deserving of considerable censure. Napoleon is represented encouraging the Old Guard for their final assault on the right centre of the British lines. Following Meissonier, the painter has depicted him on a fine upstanding seventeen-hand horse, whereas we all know—and a reference to the museum here will prove it—that

Marengo, the horse he rode on that day, was a small Arab, not exceeding fourteen hands. The day itself is indicated as bright and almost sunny; actually, it was dull and gloomy, the clouds not lifting till the moment of the final advance. The British line is represented well down the outer slope of their position, whilst here and there scarlet uniforms stand out as a bright patch of colour. As a fact, at the moment indicated, the troops were lying down behind the crest of the hill—a very important feature in the tactical history of the battle which should be preserved; but even if they had been in the position indicated, under the conditions of light and background prevailing, their brick-red tunics would have been entirely invisible as colour at the distance of over 1,000 yards from where Napoleon was standing. Moreover, calculating the height of the men and horses indicated from the angular distance they subtend in the picture, we find them to have been of the brobdingnagian proportions of 25 feet for infantry, and 40 feet for cavalry.

Another picture of the Light Brigade at Balaclava is almost equally misleading. After mature consideration of all available maps and models, we are quite unable to identify the ground on which it is represented to have taken place, whilst the position occupied by Lord Cardigan does not in any way agree with any known printed account.

It may be said that these matters do not concern us, but we submit, with all due humility, that they do, and very materially also. If this Institution exists for any purpose at all, the maintenance of some approach to historic accuracy in the accepted versions of great victories must count very highly among its objects, and we hold that no written document is half as effective in giving currency to false impressions as a technically well-executed, and widely-advertised, picture. No one is under any obligations to paint military pictures. Indeed, from a purely art standpoint their perpetration has no justification at all, they are only excusable on one ground, namely, the perpetuation of the truth of an event that, for national reasons, it is desirable to commemorate; and only one of two forms is at all admissible for their execution—either entirely commemorative, like the well-known picture of Wellington's meeting with Blücher after Waterloo, or strictly historical, like the great bulk of the pictures in the Berlin Modern Gallery.

If any one should wish to give us a really striking and dramatic pictorial representation of Waterloo, hitherto untouched, we would call his attention to the following short extract from Siborne's well-known work, describing the final victorious advance of the British infantry.

"Just at this decisive moment, the faint rays of the setting sun shone orth, and as they struggled to penetrate the almost universal haze created by the hitherto unremitting volumes of smoke which a close, dense atmosphere appeared incapable of altogether dissipating, they cast upon the varied and multitudinous objects of the battle-field a lurid light, imparting to them a colouring so strikingly impressive as can never be effaced from the memories of those who witnessed that magnificent battle scene. In front of the line, on the rise occupied by Maitland's brigade of Guards, stood prominently in view the great and noble Duke himself, his hat raised high in air, as the signal for the commencement of the general advance; leaders in front of their divisions and brigades, appearing by their animated gestures, to take the tone from their great chieftain; unfurled colours raised aloft, proudly displaying their shattered remnants; drums, bugles, trumpets, sending forth their warlike sounds to commingle with the enthusiasm and tumultuous cheering of the troops; artillerymen occupied in working out their guns from the soft soil in which they had become deeply embedded; squadrons and supports, pressing forward to gain the ridge, as this became vacated by the first line, to behold and participate in the glorious triumph; numerous isolated soldiers, hurrying on, wherever they could be spared, from attending on the wounded, to join their ranks and share in the inspiring excitement of such a moment; in the

distance, in front, the retiring masses of the French, intermingled with crowds of fugitives of all arms, mounted and dismounted; far away to the left, the dark columns of the Prussians and the smoke ascending from their batteries on the right and somewhat in advance, the dense vapour still circling slowly upward from the glowing embers of Hougoumont, assuming, as it floated, a reddish glare over the heads of the brave defenders of that post of honour; all appeared to the eyes of the beholder illumined, as it were, by a light partaking rather of the supernatural than of the ordinary effects of sunshine."—"Siborne," vol. 2, p. 206.

INDIA—CHITRAL.

The Holding of Reshun (from the *Pioneer*).

In accordance with orders received from Chitral, Lieutenants Edwardes and Fowler, R.E., left Mastuj on the 5th March *en route* to Chitral, reached Buni on the 5th, and marched to Reshun on the 6th. On the way to Reshun they received vague rumours of disturbances in Chitral, but information from supposed trustworthy sources contradicted this. Their party at Reshun consisted of Lieutenant Edwardes, Lieutenant Fowler, twenty Bengal Sappers, forty-two Kashmir Imperial Service Rifles, an orderly of Lieutenant Edwardes, three officers' servants, and two followers. They had with them, besides the kits of the party, sixty-eight boxes of Snider ammunition and some commissariat stores under escort to Chitral. The number of coolies required was about 150, locally supplied from day to day from villages. The party was rationed up to and for 11th March. They took up a position at Reshun, which could not be easily rushed, and made arrangements for safety, in the improbable event of an attack being made. The position commanded the only bridge in that neighbourhood over the Chitral River, and as the enemy, if any, were supposed to be on the further bank, after dark a picket was placed on the bridge to capture any men who might attempt to cross. The reports received were communicated to Mastuj, saying that no move would be made till definite news was received. One man was caught in the night on the bridge, a native of Reshun, but after being questioned he was released. Although there was no intention to move, coolies were ordered to be collected as if there were. On the 7th fifty only of the 150 coolies collected were loaded with some long timbers to repair a break reported in the road, and a party started out, consisting of Lieutenant Edwardes, Lieutenant Fowler, twenty Bengal Sappers, ten Kashmir Rifles and fifty coolies, carrying timbers, ropes, and tools. Two head-men of Reshun were also taken to superintend the coolies and to act as guides. In the meantime all the kit and ammunition were formed into a *sungar* on the edge of the cliff above the river, and Subadar Darm Singh and thirty Kashmir Rifles left in charge. In order to understand the position, it is necessary to describe the surrounding country.

Reshun is a large village on the left bank of the Chitral River. The houses are in detached blocks, surrounded by gardens of fruit trees. The Chitral River, crossed here by a foot-bridge, is a swift running torrent, fordable at that time of year only in a very few places. The river cliff is 100 feet high; and quite perpendicular near the British *sungar*. This *sungar* was on the crest of a cliff; 200 yards to the front was the nearest block of houses, which block was again quite distinct from the rest of the village which was mainly 300 yards further off. To the front, right and left, was a clear field of fire; to the rear the inaccessible cliff looking straight down on the bridge. Close on the left a difficult path led down a little nullah to the water, and 200 yards further on an easy path led to the water. To the right another difficult path led down a little nullah, and 300 yards off an easy path, which was really the road to the bridge below. The Chitral road from Reshun rises over a spur almost immediately after leaving the cultivation, and then descends again. The ascent and descent of 1,000 feet are very steep. Half-a-mile after crossing the spur is a narrow defile. Close on the left bank of the river the road leads between almost impracticable cliffs on the left and the river

on the right. On the further bank of the river, the cliffs are perpendicular and 100 feet high; 200 yards back from the top of the cliff is the village of Parpish—near the mouth of the Ovirgh nullah.

The party started out from Reshun and followed the road to the near defile. Here they halted and examined the cliffs to the right and left of the defile with a powerful telescope and field-glasses. On the top of the cliff on the right were stone *sungars*, which appeared empty. As nearly every cliff in the country has a *sungar* on it, this showed nothing. On the left bank, after careful search, one armed man lying down among the rocks was discovered through the telescope. It was then determined to search the left face of the hill, ascending high enough to look down into the *sungars* on the right bank of the river. Lieutenant Edwardes sent Lieutenant Fowler to do this, while he remained with the main party outside the defile. Lieutenant Fowler and his party had difficulty in finding a practicable road, but soon got higher than the *sungars* on the bank, which were seen to be empty, except for two apparently unarmed men, to whom he shouted and made signs to leave, which they did and returned to the village. His party now commenced to stalk the armed man now hidden by the lie of ground, their aim being to get above him.

They almost reached a point whence they would have seen him when a shot came from the right bank, and about 200 men rushed out of the village where they had been concealed, and made for the *sungars*. Fowler's party, 200 feet above the *sungars*, at once opened fire, hitting three or four and turning some back. There was not room for all the enemy in the small *sungars*, and Fowler's men enfiladed one face of the cliff lined by the enemy, firing on the lower party, and drove them off. Edwardes in the meantime, after the Adamzads or headmen of Reshun had tried to lure him into the defile, saw some armed men close to the road, scrambling up the cliff. He at once shouted to Fowler, almost immediately after which a shot was fired and firing became general. He then retired his men a little, returning the enemy's fire, which was very heavy, and prepared to cover Fowler's retreat should he be pursued. Fowler, seeing by the direction of the enemy's fire that the lower party had probably retired a bit, ordered his party to rejoin them. The naik of the party had been shot, and he himself wounded in the shoulder. He took the naik's rifle and about twenty rounds of ammunition, and the party scrambled and jumped down the rocks under a very heavy fire, two more men being wounded, but brought along. It now became evident that the enemy were also above them on the same hill, as the rocks came rolling down, some very close, but fortunately no one was struck. Fowler then rejoined Edwardes below, and all retired together. The spur had to be crossed, and the enemy along the hills on both sides were moving to try and cut off the retreat, and continuing to fire. A few volleys were fired, and the party continued to retire as fast as they could. Fowler's syce, seeing he was behind, brought back his pony, on which a wounded man was put up. Climbing the steep road up the spur was hard work, and the enemy were gaining ground, but the top was reached in safety, and a few men were extended along the crest to cover the descent. Here a sapper was mortally wounded, but his comrades managed to lift him on to a pony. Another body of the enemy, who had not been fighting before, now appeared above Reshun village and began to fire; they were half-right of the line of retreat, so no time was to be lost. Eventually the *sungar* was reached, and Subadar Darm Singh threw out a covering party, another man being shot through the leg *en route* and carried in. It was then found that the *sungar* was too crowded, so the well to the left was occupied, and the block of houses to the front. The enemy had begun to occupy the block of houses, but Subadar Darm Singh and twenty Kashmir Rifles, who volunteered for the assault, accompanied by Fowler, charged the village, and the enemy fled at once without resistance. The *sungar* was well placed to withstand a rush, but in this country it is impossible to choose a position near water and not commanded. It was commanded at from 800 to 500 yards to

front and rear. Nor had the defenders reckoned on having an enemy armed with Sniders and Martinis to deal with. Even the gun of the country was found to shoot with unexpected accuracy and long range, the latter probably due to the command from which it was fired. Soon the *sungar* became the centre of a hail of bullets, a good many dropping inside. One man was mortally wounded and others hit, a stray bullet also bringing down Lieutenant Edwardes's dog. Three points, supporting one another, were now being held—the *sungar*, the wall on the cliff and the block of houses to the front, but such a position could not be maintained when it got dark, so it was decided to occupy the block of houses only. The sappers started to make them defensible at once, making loopholes, parapets on the roof, blocking doors, etc., and filled every vessel with water from the stream, still running a little. Before dusk volunteers were called for to bring in the sixty-eight ammunition boxes and wounded. This duty was splendidly performed by the Kashmir sepoys, and after dusk all was in, as well as ration bags and a few kits. Almost everything including the ammunition boxes, was built into the breastworks on the roofs, in order to get cover, as these were being constructed under fire. When it got dark every man went to his post, and awaited the rush which might come at any moment. The men had had no food and little water. The losses during the day were one man killed, two mortally wounded, and about six others wounded. All the wounded and every rifle and ammunition box had been brought in. Firing went on all night. The block of houses now held was 200 yards east of the river cliff, all opn ground. At the western corner was a polo ground, bounded for about 30 yards on the side nearest the beleagured party by a wall 4 feet to 5 feet high. The defenders occupied up to the wall of the polo ground, which lay to the immediate front, and ran diagonally to the left rear. On the further side of the polo ground were more houses and trees. To the right the block of houses had a garden wall, which practically formed part of it.

Morning dawned on the 8th, after a weary night, and the men cooked and slept, a water ration being served out to each man. No enemy had ventured between the block of houses and the cliff to the abandoned *sungars*, everything left there having been untouched. All day on the 8th a heavy fire was kept up, but there were no casualties. In the evening a sortie was made for water, which met with no opposition, and in two trips all available vessels were filled.

On the 9th, just before dawn, when there was no moon, a determined assault was delivered against Edwardes's breastwork on the roof, occupied by him and the Kashmir Rifles. The enemy did not find him unprepared, and although they got behind the garden wall at 20 yards, so steady were the volleys he poured in that no man got closer. The din of tom-toms and the howling were incessant, but the dawn showed that the enemy had had enough, and they cleared off, the Pathans going last, abusing the defenders and saying the sword would get them soon. The casualties were four men killed, one mortally wounded, five or six other men more or less seriously. The number of losses of the enemy could not be estimated in the darkness, and they carried off their dead and wounded. Tom-tomming went on in the village all day, and firing was steadily kept up, but no further attack was made. All the casualties were among the Kashmir Rifles, on whose side the attack was directed.

From the 9th to the 13th the post was closely invested, the enemy trying to get closer, and the defenders firing at any man who showed himself. In this way were killed for certain eight of them, and probably many more were wounded. On the British side were wounded one seriously and two slightly. On the night of the 10th Fowler and twenty men made a sortie and surprised about fifty of the enemy, who had incautiously lit big fires in their *sungar* for warmth and to cook their food. By taking a circuitous route Lieutenant Fowler got on their flank behind their *sungar* wall and to 10 yards from the fires before being observed, shooting and bayonetting twenty of them before they could fly. The suddenness of the attack, and the glare of the firelight in the eyes of the enemy prevented any serious

resistance. Not a man of Lieutenant Fowler's party was touched. While he was out, another assault was delivered on the village, but Edwardes and his men were all at their posts, and the attack was repelled before Fowler's party returned.

On the next night an unopposed sortie was made, and the water vessels were again filled. The enemy did not care to venture between the *sungar* and the river cliff after their experiences of the night before. At night all the men were always on their posts, half resting while the other half looked out, changing every hour. The water ration was small, but was increased by collecting rain water in water-proof sheets. Then there were the *sungars* and defences to be improved and sometimes altered. The strain on the little garrison was never relaxed for a moment. The wounded required attention. The bodies of the six dead had been burned in an outhouse, and for the wounded bandages, splints, and crutches were improvised. Edwardes had a little weak solution of carbolic and some carbolic tooth powder, with which they made what shift they could. There was not sufficient water thoroughly to bathe the wounds, but the most was made of it, and pads soaked in the carbolic and the tooth powder were put on the open wounds. The behaviour of the wounded was beyond all praise; never a growl was heard, or a complaint.

A well was sunk to a depth of 12 feet, but the rock was then struck, and the attempt had to be abandoned.

On the 13th a white flag was shown by the enemy, who ceased firing, and the defenders hoisted one in return. Two Pathans then came out and demanded a parley. Jemadar Lal Khan was sent. He returned to say that a "Badshah" had just arrived from Chitral with a large following to stop the fighting. After some discussion it was settled that the "Badshah," Mahomed Isa Khan, should present himself on the side of the polo ground wall, near the gap in the wall 60 yards outside the improvised fort, and directly under fire. When he came there, Lieutenant Edwardes went to speak to him, Lieutenant Fowler and every man going to their posts. Mahomed Isa's story was that peace was restored in Chitral, and that all fighting was to cease pending the recognition of Sher Afzul as Mehtar. He offered a safe conduct to Mastuj or Chitral. Lieutenant Edwardes wrote to Mr. Robertson for instructions, and also to Mastuj and concluded an armistice, of which the terms were that the besieged remained in the fort; the enemy not to advance beyond their *sungars;* the bhisties of the garrison were to get water; supplies were to be sent; and letters and answers were to be delivered. No firing was to go on. These terms were carried out. Some fowls, a sheep, eggs, etc., were sent to the outside walls by one man, and the bhisties got water.

Vigilance by day or by night was in no way relaxed. Next day, the 14th, all the vessels were filled in the morning from rain water. Mahomed Isa and another big man, Yad Gar Beg, who brought the same story again, had an interview, and the bhisties got water and more supplies sent. More letters were written to Chitral.

On the 15th snow was lying in the morning, but the sun cleared it off. Mahomed Isa sent in to ask if he might play a game of polo and have a tamasha on the polo ground. As they would be under fire, the request was granted. He then asked that the officers should be present to join in the general rejoicing at peace having been restored. This was considered, and in the circumstances Lieutenants Edwardes and Fowler did not like to refuse. On the arrival of Mahomed Isa, Yad Gar Beg, and a third big man, they both went out. All the men were posted and the exit used was left open, so that one man could pass through, and a sentry with fixed bayonet placed outside. The officers went to the usual meeting place, the end of the polo wall, 60 yards from the loopholes. The further side of the polo ground had no cover, so Mahomed Isa was asked to order all his followers over there. A charpoy, with Yad Gar Beg was set in the gap, Mahomed Isa playing polo. Tea and some biscuits were offered and accepted,

and after the polo, a dance was proposed, and the permission of the English officers asked, the custom being for the losing team to dance. The request was complied with. Under the excuse of a wet place in front of the charpoy, the charpoy, while Edwardes and Fowler were standing up, was shifted just under cover of the end of the wall. It was difficult to object to this. Even then all men sitting on the further side were exposed to fire, and it seemed impossible that any attempt to treachery could be unattended with heavy loss to them. The dance proceeded. It was the usual country dance, and the men pressed up closer, a number moving over to the defenders' side of the wall. Fowler and Edwardes then stood up, and said they would go in. Mahomed Isa immediately threw himself on them, and a rush of men got them down under the wall. Firing began at once from the fort, and was replied to Fowler and Edwardes were firmly bound and dragged along the ground by men, stooping down, so they could see nothing of what was going on. The firing, which at first was heavy, gradually dwindled to single shots. Then men came out from the direction of the post carrying dead, wounded and loot. The pockets of the two captured officers had been torn open, their buttons and badges torn off, and even their braces and buckles did not escape. Fowler's boots and stockings were taken off by a jemadar of Pathans, but the rascal was promptly shot in the head and hand by some of the sepoys. Fowler recovered his boots through Majid Khan in Chitral, and the jemadar died later in sight of the officers he had insulted, in crossing the Lowari Pass.

Fowler and Edwardes were then taken to Mahomad Isa's house, given a little food, and passed the night bound and strongly guarded. They were subsequently sent to Chitral, being taken over by an escort of Umra Khan's Pathans on the way.

Reaching Chitral on the 19th they saw Jemadar Lal Khan and eleven other captured sepoys, who had preceded them, and they were taken to see both Majid Khan, Umra Khan's representative, and Sher Afzul. Both expressed sorrow and regret at the treachery practised upon them, Majid Khan stating that the Subadar who had been present was in prison. Both received the officers civilly. For the next few days the prisoners remained in Chitral, living in a room with the native officers; a colonel, major, etc., of Umra Khan's regiment were then there. The jemadar and other sepoys were in a small room in another block of houses.

On the 24th the party marched for Drosh, and reached it on the 25th, and here they saw Umra Khan. He received them very well, but did not say much on this occasion, except that he seemed rather annoyed when the two officers asked to be released. The next day he sent for them again, and asked them what they wished to do—whether to remain at Drosh, go to Jhandoul with him, or be sent into Chitral fort. The last proposition was taken as a good joke by the bystanders, but Fowler and Edwardes accepted it, until they were told that none of their sepoys would be sent with them, when they refused, and elected to go to Jhandoul with Umra Khan. By Umra Khan's permission, however, they wrote a letter to Mr. Robertson, saying that it was the Jhandoul Chief's intention to keep him in Chitral fort till he chose to come out, and then to escort him down to Peshawar.

The next day they started with the sepoys and Umra Khan for Jhandoul, halting for one night only at Ashreth, Dir and Bundai, and arriving at Barwar on the 30th. During the march the officers were generously supplied with ponies and given the best food obtainable, but, owing to the numbers of men who had been passing through this country supplies were difficult to obtain until the party reached Dir. The sepoys marched with the party, one sapper unfortunately dying after crossing the pass. On arrival at Barwar the two officers were given very good quarters in a new building, half open on one side; and until the people began to fly at the approach of General Low's force they were given very good food indeed. Umra Khan twice took them hawking with him, and was always much interested in what they said, and treated them in a friendly manner.

During their captivity they were always closely guarded, and allowed to communicate with no one except through the Khan. A strong guard of ten men or more, with rifles always loaded, never let them more than a few yards out of their sight; they slept in the same room and treated them as equals, sharing with them anything they had, and were probably as much for their protection as anything else. The officers knew, however, that any fanatic with a blood feud might try and kill them at any moment.

When Umra Khan had leisure and was in the same place, they saw him or his younger brother of Dir every day, and they do not believe that under any circumstances the Chief intended to be the direct cause of injury to them. On the contrary, they consider that he treated them very well, and in a straightforward manner. He gave Lieutenant Edwardes back his own sword, looted at Reshun, which had been sent to Umra Khan as a present from Mahomed Isa, and he promised to try and get Fowler's for him. The two officers were prisoners for exactly a month.

Colonel Kelly's March to Chitral.

We are indebted to the columns of the *Times* for the following account of Colonel Kelly's brilliant march to the relief of Chitral. How brilliant a feat this was, will be evident if we compare it with the passages of the Alps by French and Russian troops during the Napoleonic wars, which have hitherto ranked, and deservedly so, as standards of soldier-like endurance. Without following each of these marches in detail, it will be sufficient to state that the actual length of sheer mountain work traversed in no case exceeded 75 miles, and the highest altitude attained was under 7,000 feet, and as regards the difficulties of supply and transport overcome, only those who have made personal acquaintance with the Kashmir coolie can form any adequate conception.

On March 23rd and 24th his little force left Gilgit in two detachments. The first, which Colonel Kelly himself accompanied, was composed of 200 men of the 32nd Pioneers under Captain Borrodaile, with Lieutenants Bethune (Adjutant) and Cobbe, and Surgeon-Captain Browning-Smith; and the second of 200 Pioneers under Lieutenants Peterson and Cooke, and two guns of the Kashmir Mountain Battery.

The news from the Chitral direction was now growing worse and worse. Captain Ross's party had been almost annihilated, himself killed, and his lieutenant, Jones, wounded; Lieutenant Edwardes and Fowler had been captured; Mastuj was invested, and not a word could be heard from Chitral. The country in front was as difficult as any in the world. Along the whole route there were positions where the check the British troops experienced at Nilt in the Hunza campaign, might be repeated, and a serious check—anything, indeed, but complete success—might have given in Yasin, just that turn to events which they took in Chitral proper, once the tribesmen had got to imagine the British were not invincible. A snowy pass, 12,400 feet in height, had to be crossed and the main part of the work to be done on the other side, with it in rear. Colonel Kelly's task was, therefore, no ordinary one, but such as could only be accomplished by the best of troops and the most resolute of leaders.

At Gupis, 65 miles from Gilgit, where there is a small fort, built last year by the Government of India as an advance post in the direction of Chitral, Lieutenant Stewart, R.A., was picked up to take command of the two guns brought from Gilgit. This, as it proved, was a most valuable addition to the force, for Lieutenant Stewart is not only a highly scientific artilleryman and one who took the highest places in professional examinations, but also a man of unbounded energy and determination. Five marches further on, at Ghizr, was another post, under Lieutenant Gough. There were here sixty men of the Kashmir Rifles, 100 Hunza-Nagar levies, and forty Kashmir Sappers and Miners, under Lieutenant Oldham, R.E.

Here, at Ghizr, the leading party of the Pioneers halted for the second party to come up. It had snowed here for five days continuously, and the snow lay over a foot deep on the ground. The height of this place is 10,000 feet, and the prospects of crossing the Shandur Pass, two marches ahead, seemed anything but encouraging. On April 1st the whole column, which now consisted of 400 men 32nd Pioneers, two guns Kashmir Mountain Battery, forty Kashmir Sappers and Miners, and 100 Hunza-Nagar levies—in all about 600 fighting men—set out towards the pass. But, after proceeding eight miles, they found the task of forcing their way through the snow was too great for the mules. They sunk belly-deep into it, and floundered about till they became utterly exhausted. It was useless to attempt to take them any further, so at 3 o'clock Colonel Kelly returned with half the force to Ghizr, leaving Captain Borrodaile in command of the remainder at Teru, the point they had now reached, with all the coolie transport with the force and with ten days' supplies, to make the attempt to cross the pass. At 5 o'clock that day it again came on to snow heavily; Colonel Kelly's party did not reach Ghizr again till some hours after dark; and things began to look very black indeed.

We must now follow Captain Borrodaile, upon whom devolved the task of proving whether the pass really could be crossed or whether the whole enterprise must end in failure, as some had now begun to think probable. On the following day, April 2nd, he had to remain halted at Teru, on account of the heavy snow which was still falling; but on the 3rd he set out, his party consisting of 200 Pioneers, forty Sappers and Miners under Lieutenant Oldham, and the two guns under Lieutenant Stewart, who had already given evidence of his energy by riding back 30 miles to catch up his coolies, who had run away during the night, bringing back the whole lot single-handed, and returning to camp fairly exhausted, but with the necessary men to carry on his guns. The distance from Teru to Langar, the camping ground at the foot of the Shandur Pass, is only seven miles, but Captain Borrodaile's party were not all in till 11 o'clock that night. The guns had to be taken along partly on rough sledges improvised for the occasion, and partly on men; and the labour of taking them through with their carriages and the ammunition cases and all the appurtenances of a battery was almost too much. At Langar there was only one small hut, which was given up for the use of the sick and frost-bitten, and the party had no tents. Officers and men and the whole band of luckless coolies had, therefore, to sleep on the snow in the open. As a matter of fact, however, they slept but little, for the cold was intense. They lit big fires and sat round them through the night, thinking of the still more difficult task which lay before them on the morrow.

Next morning they started off with the object, first of all, of making a road over the pass. Exhausted by their exertions on the previous day and the cold sleepless night they had passed they made their way but slowly. The pass in summer is an easy one, without any steep ascents, but at this season of the year, when the snow was lying deep and soft and yielding from the freshness of the fall and from the heat of the April sun during the day, it was of almost insurmountable difficulty. It is curious to note, too, that, added to their other trials, the men suffered much from thirst. They actually passed over a frozen lake, but do not seem to have been aware of it; and eating snow did not satisfy them. Moreover, most of the Sikhs refused to touch the snow, imagining that it would put their insides out of order for the rest of their lives. With all these difficulties one may well imagine the set determination on the part of the officers that was required to carry men from the plains of India through them. By evening Captain Borrodaile reached Laspur, on the far side of the pass, and immediately intrenched himself, for his was a detached party now arrived in the part of the country which had risen almost to a man against the British, and his retreat was practically cut off by the pass. Colonel Kelly thinks that the enemy must have had accurate knowledge of every movement of his force, but Captain Borrodaile

believes that the villagers at Laspur were completely taken by surprise at his sudden appearance. They may have believed that the British force would appear some time, but they could hardly have expected it to cross the pass so soon after the recent fall of snow. Whether they were surprised or not, Captain Borrodaile managed to seize a number of them and take them back the next day to assist in carrying the guns over the pass. The Pioneers themseves helped to carry the guns, which were at last safely brought into Laspur, and so was accomplished a feat which would have been creditable if performed by troops accustomed to cold and snow and mountain campaigns, but which, when performed by men brought up in the plains of India, who had scarcely before seen snow, may be considered a most brilliant achievement, making only one more instance of the manner in which the troops of the Indian Army rise to the occasion when the call is made upon them, however strange to them that call may be. The men of Captain Borrodaile's party, as I have said, travelled without tents; they had 15 lbs. of baggage each, they wore poshtins (short sheepskin coat) carried their great-coats, and each man carried 80 rounds of ammunition.

The day after the guns had been brought over, Captain Borrodaile reconnoitred down the valley towards Mastuj. Meanwhile Colonel Kelley, with fifty levies—the rest of his force remaining there till the 8th—had left Ghizr on the 5th, and reached Laspur on the 6th, the day of Captain Borrodaile's reconnaissance. On the 7th there was a halt to recover the men and to collect transport. The same day fifty more levies, under Rajah Akbar Khan, of Punyal, arrived, and on the following morning the levies leading and skirmishing on in front, the little force marched and reached Gasht, one march from Mastuj, without opposition. Beyond was a position named Chokazwat, which it was reported the enemy would occupy, and this Lieutenant Beynon was sent on that evening to reconnoitre. On the morning of the 9th, Colonel Kelly, with 188 Pioneers, two guns, thirty-six Sappers and Miners, and 100 levies, marched out to attack the tribesmen intrenched in one of those standard positions of the country which are always occupied by the people when invasion is threatened. In a mountainous country like Chitral an invader can only advance down the valleys, and along each valley there are certain natural obstacles which practically block the way, so that the people have only to add on a few "sangars," or stone breastworks, to prevent any one from proceeding along the bottom of the valley. The only thing for an invader then to do is to send parties high up on the mountain sides to outflank the defenders, and this is what Colonel Kelly now decided upon doing. At daybreak Lieutenant Beynon, with fifty Hunza levies, was sent off to ascend the mountain sides on the left, and the Punyal levies were despatched to the right. The mountains were steep and rugged, but to the men of the levies, born among such as these, and superb cragsmen, this made little difference, and by eleven they had turned the right flank of the enemy. Meanwhile the main body, starting a couple of hours after Lieutenant Beynon, advanced down the main valley and opened fire with guns upon the enemy's sangars. The combined effect of the turning movement and of fire from guns such as they had never experienced before, was to make them retreat hastily from sangar to sangar, till they finally fled precipitately down the valley, while the Pioneers sent volley after volley after them. This very successful action, which opened the way to Mastuj and gave the first sign that the tide had now begun to turn, cost Colonel Kelly a loss of only five men wounded, while the enemy were computed to have lost twenty-five killed and fifty wounded.

No halt was made after the action, but Colonel Kelly marched straight on to Mastuj that evening, and so relieved Captain Bretherton and Lieutenant Moberly, D.S.O., who had been shut up there for eighteen days by a besieging force of about 1,500 men under Mohamed Isa and some forty of Umra Khan's men. The garrison consisted of forty-six of the 14th Sikhs, and 250 Kashmir troops. They had never actually been attacked in the fort at Mastuj, but had been blockaded, as it were, after the disaster to Captain Ross's party, and the capture of Lieutenants Edwardes and Fowler.

In connection with the former event, I must pause here to record a smart piece of work carried out by Lieutenant Moberly, who had already distinguished himself by his gallantry in the fight at Chilas two years ago. When news reached Mastuj of the disaster to Captain Ross, and of Lieutenant Jones having bravely, and against fearful odds, fought his way back to Buni though himself wounded, and though only a fragment of the original party remained, Lieutenant Moberly set out with 150 men of the Kashmir Regiment, marched 18 miles to Buni, picked up Lieutenant Jones and his men, and returned to Mastuj the same day; thus, by the celerity and unexpectedness of his movement, giving the enemy no chance of blocking the way behind or before him. In this way Lieutenant Jones, whose conduct of the retreat of the remnant of Captain Ross's party is one of the finest in this series of fine actions, was saved from the fate which befel the unfortunate commander.

On April 10th Colonel Kelly halted at Mastuj to allow the other half of his force to come up from Ghizr, and these having arrived on the following day he set out for Chitral on the 13th. A reconnaissance had shown that the enemy occupied a strong position on the Nisagol, about seven miles below Mastuj. This is one of the most renowned positions in the country and remarkable for its strength. Many fights had before taken place in this very place, and it was reputed to be, as nearly as can be, impregnable. The valley is here about a mile wide and is bounded on either hand by steep rocky mountains, those on the left bank being especially difficult, and up against these latter the river runs. At first sight it appears as if the bottom of the valley was a smooth plain gently sloping down from the right-hand hills to the left, and it is not till one is actually on it that it is discovered that this seemingly open plain is cleft by a nulla—by what, in fact might be called a cañon—from two to three hundred feet deep, with absolutely perpendicular sides. Across this there is only one path—the road to Chitral—and this the enemy would naturally have blocked and cut away. The edge of this nulla nearest Chitral the enemy had now fortified with sangars and these breastworks had also been erected on the hillside on the right of the valley. This was the first of the positions on the way to Chitral.

Colonel Kelly now had with him 382 Pioneers under Captain Borrodaile; two guns under Lieutenant Stewart, R.A.; 100 Kashmir Infantry under Lieutenant Moberly; thirty-four Kashmir Sappers and Miners under Lieutenant Oldham, R.E.; and 100 Hunza and Punyal levies. He once again adopted his tactics of turning the enemies position with levies, and pounding them with the guns and rifle fire. The Punyalis were sent far away up the valley, from which issued the stream that had cut the gorge across the plain. They were to find a way across it high up, and then climb the mountain side on the right, and so turn the enemy's left flank. While this movement was being effected, Colonel Kelly, with the main body, advanced across the plain with two companies of the Pioneers in the front line, two companies of the Pioneers in support, and the company of Kashmir Infantry in reserve. At 500 yards he came into action with his guns against the sangars, erected on the spur to the right, and volleys were fired on it at the same time. The result here again was that, as the Punyal levies had also by this time worked round their flank, the enemy took the earliest opportunity to evacuate their sangars, and they came tumbling helter-skelter down the mountain side, hardly a man, however, reaching the bottom, as they were knocked over by volleys from the Pioneers. The guns and the Pioneers now directed their attention to the sangars lining the edge of the deep nulla, keeping up a steady fire on them, and sustaining their fire for more than two hours. Owing to the conformation of the ground, it was impossible to find a position for the guns till within 300 yards, and it was at this short range that they had to open fire, while a guard was kept round the drivers of the country ponies who carried the guns, to prevent their running away. While this firing was going on Lieutenant Beynon with a few men, had been searching for a way across the nulla, and by letting

men down with ropes and turbans, and with the aid of some ladders, a passage across had been effected. But the enemy, with their flank turned, and with the severe punishing they were undergoing from the guns and rifle fire, now gave way along the whole line and fled, while Colonel Kelly marched his men over by the ordinary path, and occupied the village of Sanoghar a mile further on, on the opposite side of the river, that same evening, and captured many of the leading men there.

This second success was even greater than the first and far more important in its results. Mohamed Isa, Sher Afzul's right-hand man, was commanding here in person, and all the principal men of the country not at Chitral were with him; many of them were armed with Sniders and Martinis; there was a good backing of Umra Khan's veterans, and the whole were occupying a position in whose strength they had unbounded reliance. The loss of this was, therefore, a blow to them of the most serious nature.

Next day Colonel Kelly made an unexpected march on Kila Drasan, a fort where it had been reported large numbers of the enemy would assemble. The road had been broken, necessitating a detour which entailed a march of 20 miles upon the troops; but the fort was found unoccupied, and a welcome supply of grain was discovered there. On the following day (April 15th) the troops marched through pouring rain to Kusht; and on the 16th to Lun, all the villages along the route being deserted. Colonel Kelly was by this movement high up on the hill-sides, avoiding the narrow defiles through which the usual road to Chitral, close down by the river along the left bank, passes, and especially that gorge in which Captain Ross's party had suffered so terribly. The movement was rapid and unexpected, and completely outwitted the Chitralis, who had meant to make one more stand near where Captain Ross was killed. Having circumvented them, Colonel Kelly descended from the high ground and crossed the Chitral river equally unexpectedly, for the river is usually considered to be unfordable. As it was the water was well up to the men's armpits, and it was only possible for them to cross in batches of ten or twelve, to steady themselves. But the passage was successfully accomplished on the 17th, and the force that day reached Barnas, well on the Chitral side of both Karak and Reshun, the scenes of the disasters to Captain Ross and Lieutenants Edwardes and Fowler's parties.

All this time Colonel Kelly had been making every possible effort to obtain news of Mr. Robertson, but could not get a single line from him, just as Mr. Robertson, as we have already seen, could hear nothing of any movement from Gilgit. But on the next day's march, as Colonel Kelly reached Koghazi, only one march from Chitral, a letter was received from Mr. Robertson saying that the siege had been raised and that Sher Afzul had fled. Just as before Sher Afzul and Umra Khan had brought men pouring in from all sides upon the British force, so now British troops from either side were gathering irresistibly round the Chitralis and Pathans. The tables were now turned. British ascendency was once more re-established, and Sher Afzul, with his Pathan allies, had to flee even more rapidly than they had come. On April 20th Colonel Kelly marched into Chitral, and thus was brought to a close a march which is almost unique. It had been carried out with uninterrupted success. The elements had checked the troops, though not baffled them. But the enemy had not been able to delay them for a single day. The actions they fought were taken in the day's march, and their conspicuous success produced a deep impression upon the Chitralis. To their minds it seemed that nothing could stop Colonel Kelly. The difficulties of the road, the snows of the Shandur Pass, their most impregnable positions—none of these had had the slightest effect in arresting his progress, and it is no wonder that they regard him with especial reverence as a fighting commander. And not only the Chitralis will feel thus, but all who can appreciate the difficulties he had to overcome and the risks he had to run will admire his resolution and resource and the bravery and endurance of the troops he commanded. The march from

Gilgit to Chitral will ever be regarded as one of the most splendid achievements of the Indian Army. Its accomplishment has shown that the officers and the men of that army are capable of performing deeds as grand and as noble as their fathers did before them; and to Colonel Kelly, Captain Borrodaile, Lieutenant Stewart, and the other officers of the force are due the highest praise and admiration from their fellow-countrymen who have watched and appreciated their deeds.'

Action at the Koragh Defile.

The *Pioneer* gives the following interesting account of the action at the Koragh defile:—Lieutenant Jones, 15th Sikhs, has sent in an interesting report of the three days' fighting in the Koragh defile, when Captain Ross and forty-six Sikhs were killed. The report was delayed owing to Mr. Jones himself being among the wounded. It is needless to go over old ground, but the story may be taken up from the point where Captain Ross, Mr. Jones, and sixty men of the 15th Sikhs, found themselves suddenly fired upon from a *sungar* across the road at the Reshun end of the defile. This was the first sign of the enemy, but immediately men appeared on all the mountain tops, and stones were rolled down natural shoots on the hillsides. Ross decided to fall back upon Koragh, as it would be useless to go on to Reshun, leaving the enemy in such a position in his rear. Jones was instructed to proceed with ten men to seize the Koragh end of the defile, in order to cover the retirement. He carried out his order, but there was another *sungar* manned by the enemy commanding the exit from the defile, and by the time he was within 100 yards of this, only two out of the ten men with him remained unwounded. He could not advance further, and sent back word to Ross. The latter had meanwhile occupied two caves in the river bank, and here the whole party collected. Ross decided to wait till the moon rose, and then try and force his way out. Accordingly at 8 p.m. a start was made, but the tribesmen were on the alert. The leading sepoys had got about half way across the shoot towards the *sungar* at the Koragh entrance to the defile, when such a torrent of rocks came down that Ross feared the whole party might be annihilated if he pushed on. A return, therefore, was made to the caves. Then it was resolved to try and scale the spur actually above the caves. This attempt was unsuccessful, as some little distance up, a precipice was come upon. A sepoy fell over and was killed. Without any guide who knew the lie of the country it was impossible to proceed, and again a retirement was made to the caves. It was 3 a.m. before these were reached, and everyone was then tired out. There was nothing for it but to remain there, and the rest of the night and the whole of the following day the party stayed in their place of refuge. The tribesmen fired a few shots, but as the entrance was guarded by a breastwork no one was hit. Mr. Jones says:—"During the 9th Ross and myself agreed that the only thing for us to do was to cut our way back to Koragh at all costs, and we decided to make the attempt about 2 a.m. on the 10th, when we thought the enemy would least expect it. We started accordingly, attacked their *sungars*, and drove them out. They retired a short distance to a hill and kept up a brisk fire from behind rocks. There was also a heavy fire kept up from their other *sungars* on the right bank of the river. A large number of sepoys were killed (or so severely wounded as not to be able to move) by stones rolled down a shoot which ran right into the river. Ross himself was killed in front of one of the *sungars*. I and seventeen rank-and-file reached the maidan on the Koragh side of the defile in safety. When I got there I halted and re-formed my men, and stayed there some ten minutes, keeping up a heavy fire on the *sungars* on both banks of the river, in order to help any more of the men who might get through. While we were halted here two bodies of the enemy's swordsmen attempted to charge us, but were checked by volleys, losing heavily. As the enemy now showed signs of cutting our line of retreat, I considered it was time to retire, especially as two more of my party were killed and one mortally

wounded, while I had been waiting there. Of the remainder I myself and nine sepoys were wounded. We retired slowly on Buni, where we arrived about 6 a.m. It was quite impossible to bring away any wounded men who were unable to walk with us. It was equally impossible to bring their rifles, and, therefore, a certain number of these, about forty, fell into the enemy's hands."

Mr. Jones and the survivors, with a native officer and thirty-three men, who had been left behind at Buni, were, as we know, rescued by Lieutenant Moberly on March 17th.

Mr. Jones concludes his report with the remark that he cannot say too much of the steadiness and gallantry shown by the men of the detachment, whose behaviour throughout was above praise. He recommends all the fourteen survivors for the Order of Merit.

CHITRAL.—The span of the second suspension bridge recently constructed over the Panjkora by Captain Sergeant, R.E., has a span of 200 feet, the material employed for the cables being telegraph wire. Since to carry infantry two deep crowded by a check over this span, two 5½-inch steel wire hawser-laid cables, each with a breaking weight of 75 tons, are required, some idea of the difficulties overcome with this improvised material can be formed. It is also reported that twelve pontoons have been got over the Malakand Pass, which implies an enormous amount of work done on the road.

The following return, dated 2nd May, of the number of transport animals other than those belonging to the Government obtained for the field force is instructive:—Camels, hired, 6,845; purchased, 1,003. Mules, hired, 3,519; purchased, 534. Bullocks, hired, 7,329. Donkeys, hired, 2,718; purchased, 192. Ponies, purchased, 3,026. Total, 25,186.

AUSTRIA-HUNGARY.—The new 5-millimetre rifle has not yet been accepted, though numerous experiments with it have been made. It is on the Mannlicher principle, with an initial velocity of 850 metres, and a remaining velocity at 4,000 metres, sufficient to inflict severe wounds. Though so far satisfactory, important defects in other respects have developed themselves, and the question is yet far from being settled.—*Revue d'Artillerie.*

FRANCE.—The *Revue du Cercle Militaire* notes the embarkation of a battalion of Russian Volunteers for Madagascar to operate on the French side. They are commanded and were raised by a Doctor Dvorachin, and though nominally medical attendants, are in reality a fine fighting force about 1,000 strong.

The English specifications of M. Turpin's new and destructive war engine have been published, and their perusal fully justifies the action of the French War Ministry in refusing to consider his invention in its present form. Essentially the idea is to confer rotation on a gigantic war rocket by means extraneous to the rocket itself, such as a gas, oil, or electric motor capable of imparting a sufficiently high velocity of rotation to ensure the steadiness of the projectile in flight. Such machinery must either be very heavy indeed, or be secured to a permanent foundation, to obtain sufficient steadiness, and even when these difficulties are overcome there still remain all the original objections to the rocket itself, chief amongst which is its inherent inaccuracy and the possibilities of unlimited deviation from the line of fight after graze or impact on the ground, or other obstacle. How serious these deviations may become all those who are acquainted with Shoeburyness traditions will be well aware.

According to the *Spectateur Militaire,* the Artillery Committee are engaged in experiments with a new aluminium cuirass. No attempt will be made to secure resistance sufficient to stop a bullet, but only enough to protect the wearer against sword and lance wounds.

GERMANY.—A competitive trial of dogs trained for war purposes was held at Dresden on the conclusion of the International Dog Show on May 24th. Ten dogs were entered for the competition, viz., three from the Guard Rifle Battalion, one from the Guard Sharpshooter Battalion, one from the East Prussian Rifle Battalion No. 1, three from the Saxon Rifle Battalion No. 12, and two from the Saxon Rifle Battalion No. 15. The trial took place in connection with the field exercises of a company of rifles. Officers patrols were sent forward, accompanied by war dogs, to a distance of a mile from the company, and communication was maintained by means of the dogs, who carried messages to and fro between the company and the patrols. The dogs accomplished their tasks most satisfactorily, although working under very difficult circumstances, for the weather was very hot, the troops with whom they had to work were quite unknown to them, the ground was very broken and intersected by cross roads, and the scent of a fox had been spread over it shortly before the trial began. The average time taken by the dogs to cover the distance of one mile between the company and the patrols was two minutes. One dog repeatedly covered the distance in one minute. Afterwards when the company advanced against an imaginary enemy the dogs were employed to carry ammunition to the firing line. Each dog carried either 250 ball cartridge, or 350 blank cartridges on a kind of saddle, and passed along the firing line, so that each man could help himself to what ammunition he required. The dogs were next employed in seeking out, and calling attention to, wounded men, which they did in various ways. One dog merely barked on finding the wounded man, another went back to find his leader, and guided him to the spot, and a third picked up the wounded man's headdress and carried it to his leader to attract his attention. The trial was most successful in every way, and was held to prove conclusively that most valuable services might be rendered by trained dogs in time of war.—*Allgemeine Zeitung, May 30th, 1895.*

The Emperor's manœuvres in Germany this year are to be on a larger scale than usual. Four army corps and two cavalry divisions, also two balloon detachments will take part in them—the four corps being the Guard, Second, Third, and Ninth. They will last three days, and will be held early in September. Last year the dates were from 10th to 12th. It is said that the headquarters will be at Stettin. Each corps is usually inspected separately by the Emperor a few days before the manœuvres. It is probable that there will be a grand final review.

ITALY.—The grand manœuvres this year will be held in the district, comprised between Terni, Aquila, and Solmona, *i.e.*, on the boundary of the regions of the 9th and 7th Corps (Rome and Ancona), commencing on the 20th August. The re-organisation of the Italian Artillery, is dealt with at considerable length in the May number of the *Revue d'Artillerie*, and will be interesting to specialists.

JAPAN.—The *Times* special correspondent with the Japanese Army writes from Moji under date March 26th:—"Japan may be a great Power, but this campaign is not in any degree the criterion that a war against a real army and navy would be. The mechanism works beautifully, and for that very great credit is due; but there has never been anything more than a 'smooth-water trial.' It has been shown that Japan's secret service is as nearly perfect as it could be in regard to China, for the Japanese had better military maps of the Chinese fortresses and approaches than the Chinese themselves had. Probably Japan is not so well supplied with information from other countries; but the numerous instances which have been given in this war, are sufficient to show how ably conducted is the Intelligence Department, and how ingenious and indefatigable are the spies. I have personal knowledge of individual acts of espionage in other countries that would startle foreigners and make them look askance at every Japanese abroad. It is also shown by this war that the Japanese school of

strategy is essentially slow and deliberate. In some cases which I have noted it has been needlessly so, and would have been dangerous if the foe had been active. There has been little practical demonstration of Japanese ability in face of an attack. As to marksmanship, the Japanese infantry men are very poor shots, not to be compared with their admirable artillery. I have seen skirmishes last for three or four hours, volleys fired at 500 to 1,000 yards, and not a man killed on either side. Usually this sort of 'fighting' has succeeded in driving the Chinese away. Communications among a large force are always difficult; the Japanese use no means except couriers, as far as I have seen—no bugles, semaphores, flags, heliographs, or other modern methods. This results in effectively preventing the enemy from knowing the plans. At Wei-hai-wei the signal of Admiral Ting to the vessels which fired at the Japanese on the shore when the first forts were captured was read by Lieutenant Ogilvie, British Naval Attaché with the Japanese Army, but was not read (at any rate, not in time) by any of the Japanese. As regards the Formosa campaign, there is great danger of pestilence among the troops unless some radical improvement has been effected in sanitation and water supply. I mentioned this matter in a previous letter, which I had to rewrite in very veiled language before the censor would withdraw his veto. There was in the camp about Wei-hai-wei enough sewage to have caused a terrible pestilence in ordinary weather, and nothing but the intense frost saved it; at Port Arthur and Kinchou disease is reported rife."

RUSSIA.—The Russian correspondent of the *Jahrbücher für die deutsche Armee und Marine* gives the following details of a new Q.F. field carriage devised by Lieut-General Engelhardt, a member of the Russian Artillery Committee. The absorption of the recoil is effected by sliding panels in the brackets of the trail and by a spade attachment to the point of the latter. The sights are carried sideways (how not described), so as to allow of simultaneous loading and aiming. The recoil of the carriage is reduced to barely 2 inches. The carriage has been tested by 500 rounds at the average rate of four and a half per minute before delivery, and then by 800 rounds in the presence of the committee. By improvements in the limber he has succeeded in increasing the number of rounds carried per battery from 1,200 to 1,680.

From the *Engineer* it appears that the preliminary work of the trans-Baikal section of the Siberian Railway is now concluded. This has led to the adoption of a more southern route than the one originally planned by Engineer Wjasemski, which was 1,500 versts in length, passed to the south of Lake Baikal, touched at the towns Nertschinsk and Stretinsk, and terminated at Pokrowskaja, on the river Amur. It was to have been carried to an elevation of 3,000 feet above the sea, through districts in which it was impossible to raise grain, and where but few colonists can eke out a livelihood. The line as now decided upon will be considerably longer. It will run by the rivers Disida, Tschika, Chilka, and Uda, through regions rich in salt, soda, sulphur, copper, iron, lead, silver, and gold, in which many mines have already been established. In respect to other portions of the railway, 750 miles are already opened for traffic—namely, Chelabinsk—Omsk, in the west, 500 miles; and Vladivostok—Grafskja, in the east, 250 miles. Omsk is thus in direct communication with Moscow and St. Petersburg. Of the total length of about 6,000 miles, from the Russian capital to Vladivostok, about 3,700 miles remain to be completed.

UNITED STATES.—Mr. Hudson Maxim, of New York, who has lately been experimenting with smokeless powders in all sizes of guns from rifles up to 10-inch Ordnance, has found that with smokeless powders containing a very large quantity of nitro-glycerine—50 per cent. or more—and where the carbon is converted into CO_2, the temperature is so very high that some of the CO_2 takes up another atom of carbon from the steel of the gun, with the result that the inside

surface of the gun is changed from steel to wrought iron; it is thus made softer, and this softened surface is rapidly rubbed away by the projectile and eroded by the gases. Mr. Maxim has also found that if the percentage of gun-cotton is high, with only about 7 to 10 per cent. of nitro-glycerine, the products of combustion are largely carbon monoxide, when the decomposition of the steel and the erosive action of the gases become very much diminished.

FOREIGN PERIODICALS.

NAVAL.

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens.*—No. 6 Pola and Vienna: June, 1895.—"The new coast-defence ship 'Monarch.'" "The importance of the speed of a ship as a factor in calculating the range of an object for attack." "The Electric Signal Telegraph (System Pebal-Schaschl)." "The Royal Naval Reserve in the Netherlands." "The new Italian Battle-ships and Armoured Cruisers." "Protection for Gun's Crews." "The French cruisers 'Alger' and 'Isly'" (with photographs of "Davout," "Jean-Bart" and "Alger"). "The new German coast-defence ships of the 'Siegfried' class" (with photograph). "The Tempering of Armour Plates by Electricity." "The use of the Electric Light on board ships." "Foreign Naval Notes: the German and Italian Naval Estimates for 1895-6; England, Japan, Spain, Italy, Brazil, Russia, France, and Germany." "On the Deteriorating Effect of Sea-Water on Metals." "Book Notices."

FRANCE.—*Revue Maritime et Coloniale.*—Paris: March, 1895.—"The 'Volta' in China and Tonquin (1883-1885)." "Naval Warfare"; an Analysis of Admiral Colomb's Work, by M. Boisse, Capitaine de Frégate. "Remarks on the Attack upon the Brazilian battle-ship 'Aquidaban' by the Government Torpedo-boats on the night of the 15th-16th April, 1894." "On the Utilisation in Hydrography of Photographs obtained by means of a Hand Apparatus." "Description and Working of the Hydraulic Fittings for the 13·5-inch Guns, Model 1887." "Report on the methods adopted to detect the Adulteration of Olive Oil." "Naval Notes, Foreign: Sweden, Budget for 1895-96; Germany, New Constructions since 1877-78; England; United States, Annual Report of the Secretary of the Navy; Italy, Repairs and Alterations to the 'Dandolo,' Coast Defences, 'Tarentum.'" "The Maritime Fisheries."

Le Yacht.—Paris: 4th May, 1895.—"New Ships under construction for the Italian Navy" (E. Weyl). "Yachting News." "New Japanese Cruiser 'Suma'" (with plate). "The Stability of Sailing Ships." "Naval Notes, Home and Foreign." 11th May.—"The English Navy, Meeting of the Institution of Naval Architects" (E. Weyl). "Yachting News." "The new Italian Ships" (with plans). "The new German coast-defence ship 'Siegfried'" (with plate). "The New Regulations for the Mail Services in the Mediterranean." "Naval Notes, Home and Foreign." 18th May.—"The Technical Bureau" (E. Weyl). "Yachting Notes." "Construction of a new Russian Cruiser at Havre." "Effects of Japanese Projectiles upon the Chinese Ships" (with photographs). "The Expedition to Madagascar." "The Stability of Sailing Ships." "Naval Notes, Home and Foreign." 25th May.—"Episodes of the Chino-Japanese War" (E. Weyl). "Yachting News." "The new German coast-defence ship 'Frithjof'" (with photograph). "The Merchant Marine, Home and Foreign." "Naval Notes, Home and Foreign."

Le Moniteur de la Flotte. Paris: 4th May, 1895.—"The Mail Services in the Mediterranean" (Marc Landry). "The Parliamentary Commission on the Navy." "The Madagascar Expedition." "The Magnetic Chart of the Globe." "Colonial

Notes." "Naval Notes, Home and Foreign." "Official Announcements." 11th May. — "Speed Trials" (Marc Landry). "China and Japan." "The Parliamentary Commission on the Navy." "The Expedition to Madagascar." "Colonial Notes." "Naval Notes, Home and Foreign." "Official Announcements." 18th May.—"The Working of Heavy Guns by Hand" (Marc Landry). "The Naval Budget Proposals for 1896." "The Parliamentary Commission on the Navy." "The 'Amiral-Protet.'" "The Naval Salon." "Naval Notes, Home and Foreign." "Official Announcements." 25th May.—"Armour Plates and Projectiles." "The Loss of Torpedo-boat No. 20." "Statistics of Shipwrecks." "The Mishap to the 'Amiral-Duperré.'" "Naval Notes, Home and Foreign." "Official Announcements."

La Marine Française. Paris: 10th May, 1895.—"The Standard of the German Emperor." "England in the Mediterranean: a Reply to Colonel Elsdale and Mr. Laird Clowes by M. Bernicot, Capitaine de Frégate." "The real state of English opinion on Naval Strategy" (*concluded*). "Naval Notes, Home and Foreign." "Yachting Notes." "The Merchant Navy and Foreign Commerce." 25th May.—"The Parliamentary Enquiry into the Navy, the Report of Admiral Vallon." "Report on the 'Magenta' by Admiral Vallon." "Supplementary Report on the Want of Stability of the first class battle-ships 'Marceau,' 'Magenta,' and 'Neptune.'" "Methodical Stoking" (Rear-Admiral Réveillère). "Yachting Notes." "The Regattas at Kiel and the Progress of German Yachting." "The Geographical and Colonial Movement." "Naval Notes, Home and Foreign."

GERMANY.—*Marine Rundschau.* Berlin: June, 1895.—"The Capture of Weihai-Wei" (with a sketch and plan). "The Rise and Historical Development of the Naval Officer's Profession from the Middle Ages to the Present Time" (*concluded*). "The Naval Academy of the United States." "The Injury to the Engines of the French mail steamer 'La Gascoigne'" (with sketch). "Trial of 12-inch Hardened Nickel-Steel 'Krupp' Plates" (with twelve photographs). "Foreign Naval Notes." "Notices of Books."

ITALY.—*Rivista Marittima.* Rome: May, 1895.—"The Mechanical Application of Electricity on board ships of war." "Torpedo-boats." "The Merchant Navy and Italian Administration." "Some Naval Reminiscences under Napoleon I." "The Navy of Cosimo I. and his Immediate Successors" (*continued*). Letters to the Director: "Naval Defence: Elements of Strategy, and Naval Tactics." "Our Crews." "Naval Notes, Austria, Brazil, France, Germany, England, Russia, Spain, and United States." "Notes on the Mercantile Navy." "The Baltic and North Sea Canal" (with maps and plans). "Notices of Books."

RUSSIA.—*Morskoi Sbornik.* St. Petersburg: April, 1895.—"The Search for the Wreck of the coast-defence monitor 'Rusalka' in the Summer of 1894." "On the causes of the Yearly Fluctuation in the Level of the Water in the Black Sea and Sea of Azov."

SPAIN.—*Revista General de Marina.*—Madrid: May, 1895.—"The Battle off the Yalu." "Compensation of Magnetic Declinations in the Spanish Peninsula." "Elementary Electro-Dynamics." "The War in the East: Capture of Wei-Hai-Wei." "Autopsy in cases of Drowning." "The Two Nationalities." "The Hurricane of the 10th March." "Torpedo-boats." "Naval Foreign Notes." "Notices of Books."

SWEDEN.—*Tidskrift i Sjövåsendet.* Carlscrona: March, 1895.—"The Fleet in the Past Year." "A Year's Report on the Advance in Torpedoes, Electro-

Technics, and Explosives." "What Preparations must be made in order to be able to utilise Merchant Vessels to Strengthen the Fighting Fleet." "On the Electric Lighting on board a ship of war." "The Fighting Value of our third class Armoured Vessels."

MILITARY.

AUSTRIA.—*Organ der Militär-wissenschaftlichen Vereine.* No. 5.—"Field Service Regulations"; a lecture by Major Schirmbeck, of the General Staff; well worth reading. "Fortress Warfare," by Major Miksch, K.K. Fortress Artillery; a practical study of recent works on fortification. "Wholsome Drinking Water in Camp and on the March, with special reference to the question of Filters"; by Staff-Surgeon Kratschmer, read before the International Congress for Hygiene and Demography at Buda-Pesth last year. A very valuable paper, worth attentive study. No. 6.—"The Cossacks and the 'Lava.'" "Technical Improvements in Marine Artillery," with special reference to electrical appliances.

Mittheilungen über Gegenstände des Artillerie- und Geniewesens. No. 5.—"A Pendulum for testing Ballistic Chronographs," by Dr. Wolff (with plates). "On Quadrants," by Captain Johann Starčević; a mathematical investigation (with plates). "Foreign Comment on Colonel von Leithner's Book." "Permanent Fortification and the Attack of Fortresses"; worth reading. Notes, "New Organisation of the German Fortress, Artillery." "The 7·5-centimetre Q.F. Gun by the Maxim-Nordenfeldt Company" (with plate). "Concrete Shelters in Improvised Works" (illustrated). "New Barracks in Germany."

FRANCE.—*Revue du Cercle Militaire.* 4th May.—"Chats on Aërial Navigation"; with illustrations of Maxim's flying machines, etc. "The Instructions of the Emperor of Japan to his Army." 11th May.—"The Italian Army in 1894." "Comparative Study of the Infantry Arms in use, 1894." 18th May.—"The Artillery in Combination with the other Arms." "Posthumous Inventions." 25th May.—"Mounted Orderlies for Infantry in the German Army." "Artillery in Combination with the other Arms." "Pneumatic Guns in the United States."

Journal des Sciences Militaires. May.—"Strategy," by General Lewal; arrival on the field of battle, deployment, preparatory formation, extent of front; admirable articles, of which a fuller *précis* will presently appear. "The Chino-Japanese War and its Ultimate Consequences." "The Metamorphosis of the Art of War," by Colonel Malcor; a very suggestive article on modern armies and modern fads; worth reading. "Infantry Tactics"; Colonel Mignot advocates line in single rank for infantry. "General Principles of Plans of Campaign." "The Cavalry of the Allies in 1814" (Weyl). "On Cypher Correspondence"; a valuable article for specialists. "The Siege of Paris"; review by General Cosseron de Villenoisey, of M. Duquet's work; well worth reading. "The French Army in 1690" (*concluded*).

Le Spectateur Militaire. 15th May.—"Leave and Furlough," by an old regimental officer; a practical and sensible article, worth reading; advocating more liberal treatment of the young soldier, and combatting the idea that their health suffers by the introduction of epidemics picked up whilst visiting their friends, "Monday Morning" seems indigenous in all services. "The Battles on the Marne," by Noel Desmayons; an able review of M. Duquet's new work. "The Lessons of War, 1812-1870," by C. Boissonet; review of recent Napoleonic memoirs. "Military Pictures at the Salon."

Revue Militaire de l'Étranger. May.—"The Horses of the German Army during the War of 1870-71"; compiled from regimental histories, and well worth reading. "The 'Feld-Jäger' Corps in Germany"; a picked corps employed as

bearers of important despatches. "Methods of Transport employed by the British in Africa." "The Chino-Japanese War." "Attack of Coast Defences according to British Authorities."

Revue d'Artillerie. May.—"The Artillery at the commencement of the Revolutionary Wars," by Captain Rouquerol; an interesting historical study. "Night Firing of Artillery." "A new Field Level for use when firing by Quadrant Elevation," adopted in the Swiss Army, 1894. "Deformations resulting from Strains and Stresses in Metal" (with illustrations). "Offensive and Defensive Armaments in the Battle off the Yalu." "Notes: Experiments of Firing at Balloons in Germany."

Revue de Cavalerie. May.—"Observations on the French Army from 1792-1808" (unsigned); an exceedingly valuable contemporary study on the evolution of the Napoleonic school of tactics. "The Instruction and Leading of Cavalry"; continuation of the translation of Lieutenant-General Pelet-Narbonne's recent publication. "A Report of General Nansouty, commanding the First Division of heavy Cavalry, 1808." "How to make a Cavalry Soldier in the least possible time" (*concluded*); full of practical hints. "The Purchase of Remounts." "The Action of the Texel."

L'Avenir Militaire. 3rd May.—"The Conflict for Liao-Tung"; decidedly against French intervention. "The 'Bouvines.'" "The Battle of Villiers, 30th November, 1870"; review of Duquet's recent "Siège de Paris." 10th May.—"Leçons de Choses"; a sensible article on the confusion introduced into the mobilisation plans by the measures taken to raise troops for Madagascar. "France and Japan." "Field Firing Exercises"; notes the difficulties of securing adequate ranges, and the German method of surmounting them in Alsace-Lorraine. 14th May.—"The Education of the Scout"; *à propos* of the regulations of the 29th July, 1884; modified 15th April, 1894. "The Yellow Invasion"; a common-sense article on an alarmist view of the dangers to Europe from the yellow races. "Speech of the Minister of War, 12th May, 1895, on the occasion of the opening of the New School of Military Hygiene at Lyons." 17th May.—"The Society for the Protection of Native Races in the Colonies." "Civilians and Soldiers in the Soudan"; extracts from the correspondence of an officer in the Soudan; worth reading. "The Application of the Rules of Law"; without partiality, favour, or affection. "Russia and Japan"; French power chained by Madagascar. 21st May.—"Religion in the Army"; *à propos* of a question in the Chambers by M. Rabier. "The Expedition to Kong." "Soldiers' Meat and Rations"; further exposure of the meat contractors. "Can a Bicycle Jump"? The writer affirms that all ordinary obstacles of the future battle-fields can be negotiated as satisfactorily by the cyclist as by the ordinary horseman! and gives examples. 20th May.—"Impondérable Oublié"; a contribution by Commandant Nigote on the question of losses in future battles; he expects the percentages to increase. "The Army in Parliament." "The Army Estimates." "Recruiting the Ranks of the Army of Crime." 31st May.—"Colonial Politics"; a temperate article, pointing out the folly of the Anglophobes. "Territorial Officers and the War Office." "The Losses of the French Army during the last century"; summary of a paper by Dr. Lagneau, read before the Academy of Medicine. The total losses he estimates at six millions. For 1870 he gives 139,000 killed, 143,000 wounded, which seems excessive.

GERMANY.—*Militär-Wochenblatt.* No. 39.—"The Campaign in Italy, 1866." Favourable review of a work by Field-marshal Freiherr von Scudier, K. K. Austrian Army, appeared in Vienna, 1894. "Reply by Vogel von Falckenstein, Lieutenant-General commanding 5th Division, to statements made by Captain Hoenig reflecting on the conduct of the late General von Falckenstein, in his History of the Main Campaign, 1866." "Is it necessary to change the Annual Course of Training in our Cavalry?"; a very thorough and detailed discussion of

the existing system, evidently from the pen of an expert; concluded in the next number. No. 40.—"Von Löbells Jahresberichte"; favourable review, notes great progress in the editing of that journal, which certainly was becoming a little tedious. 'The Report on the Swiss Military Department for 1894." "A New Bridoon Bit," by Colonel Spohr, well known as an expert in these matters. No. 41.—"The Royal Arsenal"; historical sketch of the "Zeughaus" in Berlin. This building is the "Valhalla" of Germany, and contains the finest collection of arms, uniforms, and accoutrements in the world. "Tactics"; a discussion of the views of Generals von Scherff and von Janson; read. "The War Minister von Roon as an Orator." No. 42.—"Some New Orders for the Attack of Divisions and Brigades, based on the new Regulations applied to Historical Situations"; an endeavour to issue orders in the spirit of the new regulations which will meet the difficulties exposed by General von Scherff in his "Kriegslehren"; worth study. "A Field Artillery Question"; practical study of the existing regulations, relating particularly to the 1st line of wagons. "The Telegraphic Instructions of the Austrian Cavalry." No. 44.—"Cavalry Divisions in Peace"; worth reading. "Hendrik Witbooi." No. 45.—"Lieutenant-General von Pape"; obituary notice. "Regulations for Officers participating in Military Racing, Italy." No. 46.—"The Future Armament, Employment, and Organisation of the Field Artillery"; an admirable article. Conclusions: quick firers and increased mobility. No. 47.—"The Fundamental Principles of Mobility in Field Artillery," applies primarily to local conditions; read.

Deutsche Heeres-Zeitung. 1st May.—"The New Organisation of the Siege and Garrison Artillery." "Militärische Zeitstudie über Formen, Wesen, Wissen, Können und Sein"; a powerful plea for freedom of thought and cultivation of character in the Army. Final conclusions: We require *character* in our leaders. "Knowledge" can support character, but never compensate for its want. "Science" counts for much, but is worthless without the power of execution, but this implies character, therefore encourage character; the author might be a pupil of Mr. Benjamin Kidd's, which is evidently not the case. 4th May.—"Ziethen's Raid to Jägerndorf, 1745"; interesting. "Village Fighting"; referring specially to Gravelotte-St. Privat, 18th August, 1870. 8th May.—"The Horse Allowance Regulations, 1st April, 1895." "Village Fighting" (*concluded*). 11th May.—"The Musketry Training of the Reserves and Landwehr." "Shrapnel Fire"; an interesting article, based on von Rohne's new work, "The Shrapnel Fire of Field Artillery." (Berlin: Mittler.) The author appears unaware that shrapnel fire is well understood in England. The knowledge he might have gained by a study of our records would have been invaluable to him. 15th May.—"The Loss of the 'Regina Regente.'" 18th May.—"Who will Protect our Ocean-borne Commerce?" 25th May.—"Latest from the Italian Soudan Expedition." "The Campaign on the Main, 1866," by Captain Hoenig. "Musketry Training in the French Army"; *à propos* of a circular issued by the G.O.C. XII. Corps. 29th May.—"The Re-organisation of the Russian Engineers." "Horses and Shoes," by Colonel Spohr; read.

Jahrbücher für die deutsche Armee und Marine. June.—"Friedrich von Hellwig and his Raids: an historical study of Partisan Warfare from 1792-1814," by Lieut-Colonel von Fabricius (*continued*). "The Capture of Bonn by the Elector Frederick III. of Brandenburg, 1689." "The Emperor William I.: a Reminiscence." "The Archduke Charles and the Austrian Army." "The Paschwitz Telemeter," by the inventor. "The North Sea Canal." "Geography as a Subject at the Military Schools," by Max Schlagintweit. "Military Letters from Russia"; describes Lieut-General Engelhardt's new Q.F. field-carriage, also an interesting article on the Russian cavalry horse and change in the Russian commands. "Summary of Military Inventions." "Book Notices," etc.

Neue Militärische Blätter. May.—"The Defence of the Shipka Pass." "Squadrons of Mounted Orderlies." "The Italian Artillery and Engineer

Schools." "The Military and Political Importance of Central America." "Notes on the History of the Progress of Mechanical Improvements in Armaments." "The Chino-Japanese War." "The Prospects of Cavalry on the Battle-field of the Future." "Correspondence: Germany, France, Russia; The use of the Bicycle for Company Commands on the March." "The Drainage of the Polish Swamps in 1893." "The Manœuvres of a Cavalry Corps in Orunü last September." "Extracts from the orders of General Dragomirow."

SWITZERLAND.—*Revue Militaire Suisse.* May.—"The *rôle* of Cavalry, according to the Regulations of 1894." "French Plans of Mobilisation against the Swiss and Savoyard Frontiers." "The Chino-Japanese War." "Re-organisation of the Train."

UNITED STATES.—*Journal of the Military Service Institution.* May.—"A Paper on Military Libraries" (Colonel Closson). "Hygiene and Military Efficiency" (Major Harvey). During the American Civil War 110,000 were killed in action or died of their wounds; 199,000 died of disease. In 1866 the Prussians lost 4,450 killed in action, and 6,427 by disease; in 1870 the Germans again lost 28,200 killed in action, but only 12,180 from sickness. In the American War there were 800 fewer cases of sickness per 1,000 reported in the last year than in the first. "The Army Artillery Reserve" (Captain Chester); advocates the abolition of the Corps Artillery and the substitution of the old Napoleonic Artillery Reserve. "Training of the American Soldier" (Lieutenant Butts); notes the progress in physical training in the United States forces. "Results of Experimental Firing" (Captain Black); gives tables of penetration for the new small bore Krãg-Jorgensen rifle. "Battery Competition for Gunners" (Lieutenant Wood). "United States Marine Corps" (Major Lowry). "The Fire of Dismounted Cavalry" (Lieutenant Dickman). "Infantry Drill Regulations" (Captain Kingman). "Extended Order" (Captain Hooten); discusses the origin of extended order, tracing it to the forest warfare with the red Indians. *Comment and Criticism*:—"The Preliminary Examination, West Point." "Organisation and Tactics." Reply by Captain Wagner to a review on his book, by Captain Chester. "The Infantry Drill Regulations." "The Military Academy and the Education of Officers." *Reprints and Translations*:—"Lessons of the Franco-German War" (Colonel Maurice, R.A.). "Subsistence of Troops in the Field" (Colonel Scoble). "The Distribution of Guns in an Army Corps" (Major E. S. May, R.A.). "Cavalry Charges at Mars la Tour," translated from Scheff's "Kriegslehren"; read. *Regimental Histories*:—"The Seventh Regiment of Cavalry," raised in 1866, has seen much frontier service. "The Ninth Regiment of Cavalry," also raised 1866, the same record of frontier warfare. "The Third Regiment of Infantry raised 1792," far too brief a record for such a brilliant battle roll.

NOTICES OF BOOKS.

The Naval Annual, 1895. By T. A. BRASSEY. Portsmouth and London: Griffin and Co. Price, 12s. 6d.

The new edition of Brassey's Annual shows, in some respects, a marked improvement over previous years; although in the nature of its contents it runs very much on the usual lines. Part I. consists of contributions from Lord Brassey, M. Weyl, the Editor, Commander Robinson, and Messrs. Thursfield, Harrison Moore, and Laird-Clowes. Chapter I. is devoted, as last year, to a brief statement of the "Progress of the Navy during the Past Year," which does not call for any comment; M. Weyl in Chapter II. gives his usual interesting review of the "Progress of Foreign Navies," but it does not appear to be as much up-to-date as it might be, considering the Annual does not appear until May; for instance, no mention is made of the important alterations which have been made in the "Hoche," including the removal of one of her military masts, although that battleship is now complete for sea and again in commission; further details with regard to the "Brennus" would have been of interest; the "Friant" also is not the only cruiser of her class where it has been found necessary to remove the military masts and other weights with a view of increasing the stability of these ships. There are other matters of detail wanting in the paper which M. Weyl could well have supplied. Chapter III., on the "Relative Strength of the English and other Navies," is one on which the writer, Mr. T. A. Brassey, may well be congratulated. He has put his facts clearly and concisely, and the accompanying tables have been carefully drawn up, with the result that his paper, if perhaps a little too optimistic, still shows with fair enough accuracy, how we stand as compared with France and Russia. Owing to the fact that no naval manœuvres on a large scale were carried out by any foreign fleets last year, Mr. Thursfield's contribution in Chapter IV. is not so interesting as usual, although very useful for the purpose of future reference. In Chapter V. Mr. Laird-Clowes has been at some pains to draw up a connected account of the naval operations in the war between China and Japan; it is doubtful, however, if it will receive the attention it deserves, the subject having been already so thoroughly discussed in all its bearings. Of far more real interest is Chapter VI., devoted by a contributor, whose name is not given, to the "Lessons to be drawn from the War in the East," and a perusal of which will well repay the reader, although the writer believes, as the result of his study, that the war teaches us nothing new, and his reasons for this opinion seem sound. Mr. Harrison Moore, in Chapter VII., briefly reviews the sinking of the "Kowshing" from the point of view of International Law, and draws the conclusion with apparent justice that "a breach of International Law had been committed, for which amends should be made," supporting the contention of Mr. Lawrence as opposed to the opinion of Professor Holland. Commander Robinson, in Chapter VIII., continues the investigation, which he began in last year's Annual, into the ship-building resources of this country outside the dockyards, and his paper this time is devoted to the different firms, who are in a position to supply the varied types of machinery required in our modern vessels of war. It has been compiled like the previous one with great care, and is one of the most valuable contributions to the Annual.

Chapters IX. and X. are by Lord Brassey, the one on the "Manning of the Navy," and the other on our "Ship-building Policy." It must suffice to say that both papers deserve careful consideration. In the first Lord Brassey advocates some system of short service in the Navy, the men then passing into the Reserve, and presumably then serving in the Merchant Navy; but it is very doubtful if any such scheme could be carried out. It would establish an invidious distinction

between men serving in the same ships, which in itself would be extremely bad. Secondly, no boy or young seaman worth his salt would consent, after five years in Her Majesty's Service, to descend to the discomfort and drudgery of a merchant ship. In his second paper Lord Brassey advocates, in any new programme, the construction of several battle-ships of a medium type, like the "Renown," in place of building more "Majestics"; but here again a very debatable question is raised, on which probably great difference of opinion will still be found to exist even among naval officers.

Part II. consists as usual of the alphabetical list of British and Foreign armoured and unarmoured ships and torpedo-boats, accompanied by profile and deck plans of the principal vessels in our own and foreign navies, and the editor is to be congratulated on having this year so successfully endeavoured to remove the shortcomings in the plates, which, in previous issues, have called forth some unfavourable criticism. The thickness of the armour and the calibre of the different guns being shown in the plans of ships, has made the plates this year far more valuable for the purpose of reference. Where the improvement is so marked, as it is in this part of the work, it may seem hypercritical to find fault; but there are grave errors in some of the plates which it is hardly conceivable can have come under the editor's notice before they were printed off, but which certainly call for correction in the next edition. For instance, it is difficult to understand why, when M. Weyl, in his chapter on the "Progress of Foreign Navies," gives prominence to the fact that the superstructure and one of the military masts of the "Brennus" have been removed—a work which was taken in hand nine months ago—plate 37, which purports to represent her, should have been put in; it is so extremely badly drawn, that it has never been worthy of a place in the Annual, and one would have thought that the great alterations now being effected in the ship would have afforded an excellent reason for withdrawing it and substituting something better. Similarly, the military masts of the cruisers of the "Chasseloup-Laubat" class were removed some months ago; but in plate 41, which represents the type, the military masts still appear. If not convenient to re-draw the plate, a foot-note might have been added stating that signal poles had been substituted. The "Hoche" is given three masts; she had two military ones originally, one of which, however, was removed months ago. The deck plan, moreover, shows her with nine 14-centimetre guns a side; she has only four, her armament of 14-centimetre guns having been reduced to eight, which number is correctly given in the details of the ship on page 232. Looking at plates 58 and 59, the first of which represents the "Sardegna," and the second the "Re Umberto" and "Sicilia," nobody would imagine that the ships were sister-vessels; they are so, however, and the two last-named should have been bracketed with the "Sardegna" on plate 58, which from all the information obtainable, correctly shows the disposition, etc., of the armour and armament; while 59 represents, as far as can be judged, no type of ship in the Italian Navy; and as the work of bringing this part of the Annual up to date was taken in hand, it certainly seems a pity it was not done thoroughly.

Part III. on Armour and Ordnance, by Captain Orde Browne, is as usual interesting and well illustrated, containing among other matter, a detailed description of the new Elswick 8-inch Q.F. wire gun; while Part IV., the final section of the work, is made up as usual of Official Statements, Statistics, etc.

Although many people hold the opinion, that the Annual as published at present is not the ideal work it might be made, still the editor can certainly be congratulated this year on his having made the reference portion of the work more useful than it has ever been before.

Life of General Sir E. B. Hamley. By A. INNES SHAND. Two Volumes. Blackwood and Sons, Edinburgh and London.

The late Sir Edward Hamley was a man of such diversified talents that he would probably have succeeded in any career which he might have chosen. As a novelist he made his mark in "Lady Lee's Widowhood," and his friends must regret that he gave no further work of this kind to the world. "Our Poor Relations" and "Shakespeare's Funeral" show that he possessed a considerable vein of humour, while his "Life of Voltaire," which is quite one of the best of the series of modern classics, proved his capacity as a literary critic of no mean order. But to the readers of this JOURNAL he is probably best known as a military historian and as the author of the "Operations of War." This work which is quite the best of its kind in our language was the product of his experience as the first professor of military history appointed to the Staff College. Writing at the present day it seems somewhat peculiar that this subject had never been taught at the Senior Department, the immediate predecessor of the Staff College where, indeed, to use Mr. Shand's own words, "the studies appear to have been devoted to anything rather than the science of war." The strategical portion of this book is a most able *résumé* of the various factors which affect the movements of troops, clearly reasoned out and illustrated from great campaigns; the tactical part deals more with the historical side of the question, and is now somewhat behind the times. While, however, tactics are constantly changing, the great principles which lie at the basis of strategy are immutable, and in no work in the English language are they as well set forth as in Hamley.

The campaign of Sebastopol, originally published in *Blackwood's Magazine*, gives an extremely interesting account of the siege, and although there is not much in the shape of criticism in it—as was only natural considering the fact that the author was desirous of rising in the Service—still, we learn from the extract from a private letter given on page 81 what his opinion really was of Lord Raglan, an opinion which everyone who has studied this campaign must absolutely endorse. General Hamley subsequently published "The War in the Crimea," which forms an excellent and readable account of the Eastern struggle in 1854-55. Some day an exhaustive treatise may be written on this war. If it contain the whole truth about the conflict, it will form a first-rate lesson to English statesmen of how not to do it, and will show to the British public in general that it is quite possible to wear a red coat and know nothing whatever about soldiering.

From the Staff College, after a short interval, Hamley went to the Council of Military Education, and when that body was abolished he returned once more to the Staff College as Commandant. It is only those who went through the college when he was at the head of it, and who know the reforms he introduced and how he modernised and improved the course of instruction, can rightly appreciate how much he did for the cause of military education and training in the English Army; and if he had done nothing more in his career than produce a large number of educated officers, he would have deserved well of the country.

After the Russo-Turkish War, General Hamley was employed on various delimitation commissions, for which he received the thanks of the Government and was made a K.C.M.G. He had served with distinction in the Crimean War, but it was not until 1882 that he again went on active service. In this year, at the express request of Lord Wolseley—a request which it is understood was not granted without some demur—he was given the command of the Second Division of the English Army operating in Egypt. The larger portion of the second volume is taken up with the unfortunate differences which arose between Sir Edward Hamley and his Chief. It would be undesirable, in these pages, to weigh the merits of the controversy, but it may be permitted to say that no one can read the account of them as published by Mr. Innes Shand without regretting that there was no judicious friend to smooth away the difficulties which arose. The contention that Lord Wolseley was bound to publish his subordinate's despatches

cannot be maintained, and the revival of the dispute when one of the parties is dead and the position of the other forbids reply, seems somewhat of a mistake. That the Second Division contributed largely, possibly more than the First Division, to the success of the 13th September, cannot be denied, but it must never be forgotten in criticising a battle that it is not always possible to measure the part played by any particular portion of the force simply by its death roll. That Hamley led the division with bravery and judgment all will admit, but he seems from the earliest days of Alexandria to have looked for injuries when certainly none were intended. General Hamley was, in many ways, a hyper-sensitive man, and to have been offended because the Commander-in-Chief did not unbosom himself to him as to the exact course he intended to pursue was unfortunate. From that moment onward he seems to have found a slight intended in every utterance of his leader. Anyone who knew the two men and their different dispositions can understand how the difficulties arose from trifles, which the one regarded as serious and the other looked upon as of no moment. Again we say that a judicious friend might have put all straight, and certainly no judicious friend would now have revived the controversy.

After the Egyptian war Hamley's military career wes practically ended, but he found in Parliament a fresh field for his energies. His military knowledge might here have been turned to account, but for the fact that no political party cares two pins about military affairs, and that to commence a discussion on the Army is the best possible method to adopt to empty the House of listeners. It may not always be so, and the time may come when the solid contributions to military administration and organisation made by Sir Edward Hamley will be appreciated by those who will wonder that England put up for so many years with a military system eminently unsuited to her requirements.

Mr. Shand has carried out his task with considerable ability. It was evidently a labour of love to him, but it is somewhat to be regretted that it was not undertaken by one who had more military knowledge, the lack of which no amount of literary facility can supply.

Précis of a Treatise on *Strategy in Relation to the Battle.*—By General LEWAL. *Journal des Sciences Militaires.*—January, February, and March, 1895

General Lewal commences an able treatise on strategy in relation to the battle, *i.e.*, on the preliminary and after operations, at one and the same time strategic, by reason of their combinations, and tactical in their execution; the rapid movement of masses in the required direction is a first step towards victory, and, after the battle, strategy again plays its part in the organisation of the pursuit or the retreat, etc. It is pointed out that success in war still depends on the solution of the problem of what disposition to give to masses of men so that they may move and act with the greatest possible quickness. The conditions of this problem change with time; armies are now rapidly concentrated and their distances apart on entering a campaign have greatly diminished, numbers have largely increased. Improvisation is possible with small, but not with large numbers; with the latter everything must work spontaneously and according to rule to effect combined action, and knowledge of war in all ranks must increase in proportion. The generals of to-day must be superior to such as Ney, Berthier, Grouchy, etc., who, though excellent executive officers, were wanting in conception.

The essential point in war is to decide quickly on action and to carry it out; the secret of victory lies in superior will and limitless energy, and, in order to come to a proper resolution, knowledge must guide the will.

In the February number, he considers the necessity of method; the means by which a response to the least wish of the chief by the military machine is rendered possible; when the battle begins everything is urgent; everything must be ready and work spontaneously without friction or hesitation; strategy

must direct the concurrent groups towards the common aim, tactics must do the rest; method alone can obtain concerted action from masses, and none need fear that it will kill genius, for genius is a birth and will dominate all; seekers after originality are not original, and ever wrongly attribute their want of success to method. In considering the necessity of rules to co-ordinate the action of large units, he lays down that clearly defined opinions on action to be taken in battle are most essential; the chief can only indicate the aim, and leave it to subordinates to gain it; for with the size of armies decentralisation increases; all must, more or less, mechanically work to one end, and masses must practise together in peace, as well as smaller units. Generals must now habituate themselves to direct even battles by maps.

The teachings of history, he considers, are good only when all the circumstances of the time are duly weighed in their proper connection; future battles must be dissimilar to all preceding ones; armies now at once mobilise, and at once advance to the attack without much manœuvring; the attack will be more fierce than hitherto, and attempts be made to introduce the unexpected by the masking of troops, etc.

Plans of battle, he considers, should be thoughtfully worked out; method should be followed, and everything not left to the spur of the moment; the best methods are learnt only by experience (manœuvres) and by following formal directions.

Method prevents indecision; gives a solution that can be adopted, unless, upon reflection, a better one offers itself; a good method leads officers to judge similarly of cases as they occur, and accustoms them to certain formations.

The unforeseen in battle will not often happen if the general is a leader of men, is well instructed, and has decision of character; and is trained in both theory and practice; everyone must know his duty in his own peculiar sphere, and he [who bungles in peace manœuvres will not find a solution for action in war when he has failed to find it under circumstances altogether favourable.

An instructed general will act with decision; an ill-instructed one with indecision, resulting in perplexity and demoralisation.

The initiative of subordinates must have a limit. The general must never lose control, and must intervene when necessary to remedy errors, and indicate conditions required for success, and towards which united effort is indispensable; the chief, whilst regulating the whole, leaves the particular action of each unit to itself, and looks to all to act in the sense of the general idea. He holds the reins, and units may disobey the letter of his orders whilst obeying their spirit, if local circumstances so require it. Excess of initiative shows want of confidence in the chief, and for success there must be confidence that all ranks will fulfil their special duties; consequently the initiative is allowable only when duly subordinated to the chief's aims.

General Lewal in the March number shows that knowledge is power, and information the sole means by which a mass of troops can be electrified into harmonious and concerted action. To gain it, he would not only keep in contact with the enemy's front, but despatch small selected cavalry parties *à l'enfant perdu* round his flanks and to his rear; he would push these parties 100 miles to the front, and expect information in 36 hours. Napoleon required information from all commands twice daily. He would largely extend the use of captive balloons, one at least with each army corps; at night electric search lights could be thrown from them; messages transmitted from them from corps to corps; from them, too, would orders be transmitted for concentration of fire, a general attack, etc., by optical communication. Telephone and telegraph to be also largely used.

He next considers the value of ground, and shows that the advantage of height has been often exaggerated. Napoleon took up positions to force the enemy to fight whether favourable or not, and to entice him to commit some

action that he had prepared for; in fact, to subject the enemy's plans to his own; to fight at the proper time rather than on favourable ground. These were also the principles adopted by the Germans in 1870; neither Napoleon nor Moltke considered ground of special importance, and in this differed from Turenne and Frederick; the passive element of the battle, the ground, is subordinated now to the active, the troops, and these must make the best tactical use they can of what they come across to gain the ascendancy. To this they must be trained in peace.

In considering the form that the battle should take, he points out that the pure offensive and defensive are never adopted, but that both armies take the initiative, the defensive-offensive being as much an initiative and an active form of battle as the offensive-defensive. He favours the former so long as the defensive stage only lasts a sufficient time to draw its advantages; to cause the enemy in the open to suffer heavy losses; to check him only to repulse him with vigour; to make his attack subjective to his own plans, and necessary to their evolution in due time; and when that time comes, to disconcert the formed and revealed plans of the attacker by a resolute offensive all along the line, and the introduction into the fight of the element of surprise.

The pure attack is nothing less than the offensive-defensive; the attack must rest to re-form, to breathe, and then is on the defensive; the defensive-offensive is in a manner an ambuscade, a feint, to entice the enemy to do what you wish, to commit some fault. In refuting the argument that troops keep to entrenchments, he points out that they gain in *moral* on taking the offensive and by thus introducing the unforeseen. Indeed, it shows narrow-mindedness to keep to one form; all must be used, all subordinated to keeping the initiative, to subjecting the enemy's movements to your own.

In the April number he points out that the greater the numbers, the more necessary it is to take the initiative in order to direct the battle, which now opens the campaign, instead of crowning it as formerly; the most successful battles are those forced on the enemy; the initiative knows what it means to do; the resolution to attack simplifies the problem, and the bulk of the enemy is made for; information can be obtained from maps, reconnaissances, etc., sufficient for a clear and determined plan to be carried out. The desire to be too fully informed leads to inaction and to one's plans becoming subjective to those of the enemy; Napoleon' saying "On s'engage d'abord et on voit" is perhaps the best to follow; plans must at first be laid without knowing very much of those of the enemy, and a resolution come to on probabilities. Select the happy mean and act on "sufficient" knowledge therefore. The battle of the future will be brought about by each force taking the initiative and attacking at the same time; so take the initiative at once and impose on the enemy the necessity of parrying your blows; act energetically for your own interests and compel the enemy to conform to your action; the more sudden the better. A primary good and mobile disposition of the troops is everything from the beginning of the campaign.

Near the enemy, well-exercised troops, ready for the battle, require no advanced guard, except for security; there is nowadays, when concentration is by rail, no room for it to manœuvre; any intermediate body between the army and enemy paralyses force and surprise. Consequently, advanced guards for security only, and not power, are now required. A strong advanced guard is a peril and useless; a main body should never allow itself to be stopped by an advanced guard, but should deploy sufficient force only to confront it and move on to attack; if the advanced guard resists too long, it will suffer enormously, and its former supposed advantages of causing delays are specious; by giving the main body time to make dispositions for the battle, the latter is thrown on the defensive, whilst in the meantime the enemy advances, takes his measures, and assumes the initiative. A strong advanced guard leads to its commander taking direction of the battle, and not the chief: the chief interest being with this body, the latter must be with it. Immediately before

battle Napoleon had no advanced guards, and there were none to the German armies in the battles round Metz, with the exception of a battalion or two for purposes of security. An advanced guard should always act as an offensive reconnaissance, for by attacking alone can the enemy's dispositions be found out; its action must be the beginning of the battle, and once committed to it, it is a fault to break it off; the advanced guard action must be pushed home, and the necessary information being obtained, the fight must be continued; any reconnaissance to be effective must be with the main body; if the advanced guard temporises, it loses all its *élan*. Should an advanced guard take up ground, beyond its strength, for the army it covers, it is weak everywhere, and when reinforced the army becomes a mixture of diverse units, and its command is weakened. If it occupies ground only in proportion to its own strength, its flanks are exposed. Each column requires only its own advanced troops to cover deployment, for the army cavalry is in front; the corp cavalry is in second line to it; and two or three companies of infantry only close in, in front of main columns.

When working in one main column, a strong advanced guard at a reasonable distance ahead is necessary; also when passing through mountainous districts; but they are then detached corps, and not advanced guards. Otherwise, for modern armies, advanced guards are not necessary.

(*To be continued.*)

Journal du Maréchal de Castellane. 1804-62. Vol. 1. Paris: Plon, Nourrit et Cie., 1895. Price, 6s. 6d.

The editors of this work have wisely adhered to the original journal form in which the Marshal wrote it.

Owing to the extreme youth of the author—he was only sixteen when he entered the Service—we have a strong guarantee that his notes as jotted down are free from any marked political bias, either for or against the men whose deeds he records. Since, moreover, the Marshal was not addicted to fine phrases, but simply noted events as they came within his cognisance, it is tolerably safe to accept his evidence on points of fact as first hand of the best quality, invaluable, therefore, in checking the statements of older, more experienced, but therefore, presumably more interested witnesses.

De Castellane saw his first service in Spain, where he was attached to the staff of General Mouton, subsequently Comte de Lobau, who seems to have been a very difficult man to get on with, but an exceedingly conscientious disciplinarian, and perfectly fearless in action.

It is very interesting to note the gradual change which these notes record in the attitude of the inhabitants to their deliverers: at first they were received with open arms everywhere, but within a very few months cases of orderlies, staff officers, etc., being waylaid and murdered begin to occur, and reading between the lines it is not difficult to understand why.

He took part in Napoleon's pursuit of Sir John Moore, but never came up with the advanced guard; consequently he is unable to express any opinion as to the quality of the British troops, but as to the hardships both they and we underwent he speaks most feelingly.

From Spain he went to Austria, arriving on the field of Abensberg whilst the action was still in progress. All through this campaign he abundantly confirms all that de Fezensac, who appears to have been subsequently an intimate friend of his, has told us of the want of method and generally happy-go-lucky system on which the most important staff duties, such as the transmission of orders, was carried on. As he was constantly employed by the Emperor as galloper he was evidently in a good position to judge. His account of Wagram, and, indeed, of all the actions connected with the passage of the Danube, may be usefully compared with Marbot, whom in the main he confirms.

The Russian campaign he reports at considerable length, and as by this time he had seen a considerable amount of active service, his opinions are more freely expressed and merit greater attention.

Writing without any eye to effect, he gives the reader the hard day-to-day facts of the case, and with this evidence before one it is impossible to come to any other conclusion except that it was the total want of organisation of the supply department, with the consequent dissolution of all discipline—not the intensity of the cold—which primarily led to the scenes of horror in the retreat with which we are all familiar. The French Army was in a condition of absolute dissolution, brought about by want of food, before the really intense cold set in; this view is corroborated by Marbot, and if further evidence in support of it is desired it will be found in the indisputable fact that, even when they reached the Beresina, that sluggish, unimportant little stream was still not frozen over. Marbot also has called attention to this point, and has pointed out that the confusion at the bridges was both unnecessary and avoidable, since he himself forded the river twice in the day on horseback, and that even a man on foot could have done so with no worse consequences than a wetting, undesirable enough, no doubt, under the circumstances, but still many degrees preferable to the risk of being crushed to death, which the people who overcrowded the bridges actually ran.

After his return from Russia he was not again actively employed, but he was engaged in the organisation of fresh cavalry regiments, and his experiences are well worthy the attention of cavalry specialists.

The remainder of the book is hardly of general interest, but those who wish to understand the deep-seated causes of the decay of French military institutions evinced in 1870, cannot do better than peruse it carefully.

Souvenirs de la Guerre de 1870-1, Paris, Tours, Bordeaux. Par Général THOUMAS. Paris: La Librairie Illustrée, 1895.

No point in the conduct of the 1870 campaign on the part of the French attracted greater attention or excited more surprise than the astounding celerity with which, after Sedan, battery after battery was placed at the disposal of the fighting line of troops. This book affords us in great part the detail information necessary to appreciate the work thus done, and a sufficient insight into the difficulties, in face of which it was accomplished.

General Thoumas was called to the Ministry of War, artillery material section, in 1867, and remained connected with it until some time after the conclusion of the Communistic troubles. Marshal Randon was then War Minister, but was shortly afterwards replaced by Marshal Niel. General Thoumas certifies that in January, 1867, it would have been impossible to furnish a single Corps d'Armée with its proper complement of batteries; and if this was the state of the field batteries, it may be imagined what condition the garrison artillery was in.

Marshal Niel took over charge with the definite intention of preparing for the contingency of a war with Germany, but he was hampered at every turn by the exigencies of the treasury, and to a degree which must be studied in detail to be duly appreciated. In 1869 Marshal Niel died, and was succeeded by Marshal Le Bœuf—a change not for the better, as events presently demonstrated. It was before Niel's death that the essential steps were taken which rendered it ultimately possible for the French armies to take the field practically complete in artillery, and, as far as regards their performances in the field, it was the greatest good luck that the war came when it did, for the guns, wagons, etc., having been delivered in a hurry, there were no shelters or stores available for them, and they all had to be parked out in the open, subject to the vicissitudes of heat and cold, and would have rotted from exposure had the peace lasted a few years longer. These facts ought to dispose of the last remnants of suspicion against Bismarck as *agent provocateur* of the war, for they must have been perfectly well known in Berlin; and had expediency been the sole rule of his conduct, he would certainly

have seized upon the Luxemburg case as *casus belli*, and fallen on the French when they were yet unprovided with breech-loaders, cartridges, or field-guns in adequate quantity.

The detail of the steps taken to provide guns and small arm ammunition to the troops after Sedan cannot be extracted here; they practically form three-fourths of the book, but they deserve the closest attention of all British readers: from the soldiers, because they show against what difficulties their French comrades struggled undismayed; from civilians, as proving for the thousandth time the utter impossibility of organising resistance in face of the enemy, and the danger of amateur interference.

It is worth noting that the chief trouble they had to encounter was the supply of rifle cartridges; the expenditure was perfectly prodigious, for the moment the young, undisciplined troops began to find their kits too heavy, they threw away their cartridges into the nearest ditch or cover handy, and it became impossible to supply the deficiencies thus created, because there was only one manufactory in the kingdom outside of Paris; and as the Germans pressed further and further into the country, this manufactory had to be moved further and further to the southward.

Can Russia Invade India? By Colonel H. B. HANNA, B.S.C. Westminster: Constable and Co., 1895.

Few men can claim a better right to be heard on this important subject than Colonel Hanna, who served in 1877-8 and 1889 on the Army Staff in the Afghan War, and since then has had access to documentary evidence of the most confidential kind, placed at his disposal by the Indian Government.

His object is to show that any successful invasion of India by Russia is for the present hopelessly impossible, and therefore further expenditure on our defences, or expansion of our frontier, most undesirable, for India is a poor country, and is already taxed up to the limit of its capacity.

That Russia, either with or without the aid of treachery behind us, cannot hope to conquer India unless we should lose the command of the sea, in which case we could not retain it, may be freely granted, but his deduction does not appear to follow. India is undoubtedly a poor country at the present moment, but there is no reason to suppose that she will always remain so. The trade of India is increasing and is capable of almost indefinite expansion, if once we can succeed in inspiring the natives with sufficient confidence in the permanence and stability of our rule to induce them to give up hoarding, and to invest freely in commercial undertakings. This confidence, we take it, is entirely based on the prestige inspired by the constant progress of our arms, and the repeated demonstration of their invincibility. As Professor Seeley, in his "Expansion of England" has so ably shown, in each forward movement we are simply obeying the law of our being. Time after time we have endeavoured to arrest our forward movement, but each time facts were stronger than theories, and a fresh move forward had to be commenced. As it was in the past, so it will be in the future, and in the teeth of all council one forward movement after another will be forced on us, on pain, if we refuse, of abdicating that hold on the confidence of the natives which alone results from the prestige of our victories in the field, and on which the wealth or poverty of India depends.

Annual Report of the Chief of Ordnance to the Secretary of War for 1894. Washington: Government Printing Office.

A work of this nature defies the reviewer. It will be sufficient to point out that it is full of interest to the specialist from cover to cover, and that to the ordinary searcher after knowledge it is a mine of information. The experiments with smokeless powders and with the Hebler Krnka bullet deserve special attention.

Notes on Tactics. By Captain RISHWORTH, 3rd V.B. West Riding Regiment; and Captain H. D. SICHELL, Staff, West York Volunteer Infantry Brigade. London: Stanford. Price, 3s.

Two useful little handbooks for young officers and company commanders. They both afford further proof, if any were needed, of the increasing interest the junior officers of the Army now take in their profession. Twelve years ago, or thereabouts, no such works existed. The young officer not being allowed, in the majority of regiments, to take any interest in his men, worked off his superfluous energy and cash in any way that happened to suit his personal idiosyncrasy, not always to the credit or advantage of the Service as a whole; but no sooner was he encouraged to take some interest in his command, by the concession of even a trifling share in the responsibility for the fighting efficiency of his men, than we find him busily engaged in thinking out for himself and for others the best means of utilising the time allotted to him. Ten years hence we shall have ten officers thoroughly conversant with the details of their profession where we now have only one, and when that time arrives we shall be within measurable distance of that golden age of all services when the chief cause of defeat, viz., "contradictory orders on the part of the staff," almost invariably directly due to ignorance and want of training in the exercise of responsibility, will no longer be available as plea to excuse disaster, for this ignorance will have ceased to exist.

The Far East. By HENRY NORMAN. Author of "The Real Japan." London: Fisher and Unwin, 1895. Price, 21s.

A book to be read, studied, and thought over. The conclusion to which our author irresistably impels us is, that as long as Great Britain maintains her command of the sea, and the same relatively high standard of justice in the treatment of those races which her colonial development has brought under her rule; China especially, but the Pacific as a whole, will continue to secure for her that pre-eminence in trade on which her existence as a great Power depends. Given even-handed justice between man and man, and a reasonable degree of administrative integrity, the Chinese are the most economical wealth-producing machinery in the known world. They bring capital, ability, and labour with them, and this combination, with the further advantage of cheap silver, united in the hands of the same race, can undersell any possible competition. This is a point which politicians with Socialistic proclivities would do well to bear in mind, for with the above-mentioned advantages, the East must become the regulating factor in the cost of production all over the world, placing a limit, depending on cost of transport and the reward of ability (to use Mr. Mallock's phrase), on the rate above which wages cannot rise.

As long as we maintain command of the sea these consequences must follow, as day follows night; but if, through misplaced economy, or devotion to parochial politics, we suffer this command to pass from our hands, then, since no Power is in a position to take our place, the social safety-valve will be screwed down, and an upheaval of the lower strata of society must ensue, which will probably break out first in, and do most damage to, the very nation whose restless ambition can alone bring about the catastrophe.

The Cossack Armies: Military Statistical Description, compiled from Russian Sources. By Freiherr von TETTAU, 1st Lieutenant 34th Pomeranian Fusiliers. Berlin, 1892. Translated by Lieutenant Honourable H. D. NAPIER, Intelligence Department, Q.M.G.'s Department in India. Simla Printing Office, 1895.

A copy of the above work has been received by the R.U.S.I. Library. Its perusal is strongly recommended by all interested in the Russian Army.

Field Training made Easy. By Captain G. D'ARCY-EVANS. Aldershot: Gale and Polden. Price, 2s.

The Theory of Physical Education in Elementary Schools. By THOMAS CHESTERTON, late Chief Instructor at the Aldershot Gymnasium; with a preface by Colonel G. M. ONSLOW, late Inspector of Military Gymnasia in Great Britain. London: Gale and Polden, 1895. Price, 2s. 6d.

An admirably arranged little handbook, which should prove very useful to officers and N.C. officers called on to superintend the physical training and gymnastic exercises of the men under them, or desirous of increasing their own standard of physical development. To borrow a line from Colonel Onslow's preface, "Such a manual as this has long been needed, and its want much felt; it is without doubt a very valuable addition to the literature on physical culture already in existence, and students of the subject should greet its appearance with gratitude. Mr. Chesterton is certainly deserving of high praise for having bestowed so much time, patience, and studious labour upon its production.

The Story of the Highland Brigade in the Crimea. By Lieutenant-Colonel ANTHONY STERLING, a Staff-Officer who was there. London: Remington and Co., 1895. Price, 15s.

A useful book to study and think over. The author's personality is very strongly marked, and his accounts require considerable correction for "personal error." But when all due allowances have been made, the reader will be in a better position to judge of the difficulties our generals had to meet, and the personal energy required to overcome them. To have held together an army thus riven by private jealousies, paralysed by vested interests and starved by gross defects of organisation, is a feat no men of merely ordinary capacities could have accomplished. Colonel Sterling has done excellent service in thus completing the vindication of Lord Raglan and our leaders generally, for which the country has so long been waiting.

The Crimean War from First to Last. By General Sir DANIEL LYSONS, G.C.B. London: John Murray, 1895. Price, 12s.

There are only two faults to be found with this little work. The author is far too modest and the book is too short.

Three special points also attract attention, viz.: The fact that his battalion of the 23rd R. Welsh had been carefully trained in the construction of field works, field sketching, etc., whilst at Winchester under Colonel Torrens two years before the war; the duel between the sailors' 68-pounder Jenny and the Russian gun—an anecdote we do not remember to have seen mentioned elsewhere; and the direct testimony he bears as to the conduct of his own regiment, the 23rd, in the final assault on the Redan.

Rhodesia of To-day. A description of the present condition and prospects of Matabeleland and Mashonaland. By E. F. KNIGHT. London: Longmans, Green and Co., 1895. Price, 2s. 6d.

The well-known author of "The Cruise of the Falcon," "Where Three Empires Meet," etc., should need no introduction to readers of the two Services. In 1894 he was travelling in Africa as special correspondent of the *Times*, and in this little book he has grouped together and re-arranged the facts that then came under his notice. The special quality in this work, to which attention is directed, is the fairness and impartiality with which the case for and against these new territories is stated, and for this reason it ought for many years to come to claim the attention of all those who may be called on by either duty or pleasure to form an acquaintance with our new dependencies.

Britain and her Rivals, 1713-1789. By ARTHUR D. INNES, M.A. London: Innes and Co., 1895. Price, 7s. 6d.

This book should prove invaluable to officers who, desiring to study any particular campaign within these time limits, wish to become acquainted with the general political situation of the moment. Hitherto, practically speaking, such information was almost unattainable without long and severe study. Not only were the facts dispersed over a very wide area, but their relative importance, failing the light that the doctrine of sea power has since shed upon us, frequently altogether escaped the perspicuity of contemporary writers. Mr. Innes, having taken as his foundation the works of Admiral P. H. Colomb, Professor Seeley, and Captain Mahan, has reared thereon a superstructure far better adapted to stand the rude shocks of criticism, and at the same time to act as a guide to the student in his researches.

Taktische Betrachtungen über den Festungs Angriff und die Permanente Fortification der Gegenwart. Eine Studie von PAUL REHM, K. & K. Hauptmann des Artillerie Stabes. Vienna: Braümuller. Price, 1s. 9d.

An interesting pamphlet, tracing the influence of the introduction of high explosive shells on modern fortification. The author's opinion, based on the practice tables of the Austrian 21-c.m. mortar, is, that for an expenditure of ammunition well within practicable limits, even the strongest of modern bomb-proofs can be made untenable, and once this shelter for the garrison is gone surrender must be only a matter of hours.

Notes on Hindus and Sikhs. By Lieut. DUDLEY SEAGRIM, R.A. Allahabad: Pioneer Press. Price, 1 rupee.

The first duty of any officer arriving in India, and brought into contact with native soldiers, is to acquaint himself to the best of his ability with the different castes of his men, their customs, recruiting grounds, etc., and only those who have tried conscientiously to acquire this knowledge can have any idea of the difficulties such effort involves. Realising this, Lieutenant Seagrim has selected and arranged all the leading facts requiring to be known, and brought them into the convenient compass of a small handbook, which will be found invaluable to all officers serving, or likely to serve, in the Punjab and North-West.

Argos. Rome: Raponi et Cie.

A new monthly publication, which promises well to become the most complete bibliography of matters relating to the land and sea forces of the world in existence. The contents are well arranged for reference, and, no doubt, when the preliminary difficulties which necessarily surround a work of this description are overcome, it will be exceedingly useful.

Paris: Les Batailles de la Marne, 30th November—8th December. Par ALFRED DUQUET. Paris: Charpentier, 1895. Price, 3s. 6d.

This book has been warmly praised, both in France and Germany: in the former country by General Cosseron de Villenoisey, a well-known and competent authority; and in the latter by Captain Fritz Hoenig, who characterises it as accurate and impartial.